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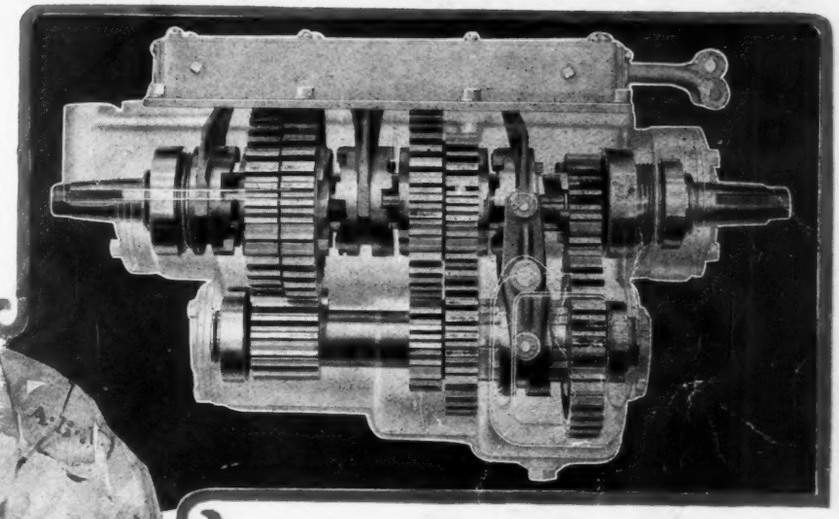

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLIII NEW YORK—THURSDAY, JULY 15, 1920 No. 3

Shall Car Prices Swing Upward or Downward?

This frank discussion of the economic factors at work in the nation's markets—both for raw and finished products—grew out of a recent telegraphic inquiry directed to some of the largest automotive factories. It seeks an answer, by considering numerous tendencies, to a pertinent question.

By Clyde Jennings

THE financial and other newspapers are beginning to discuss the probability that motor car prices soon will be sharply lowered. Headlines say this but usually a careful reading of the article that follows does not indicate that such is true. The supposition is, perhaps, natural to those who regard all merchandise as being alike. Clothing has been "cut"; so have shoes and some other articles. So why not automobiles?

But there is a difference in merchandise. One difference has been the subject of comment in this publication at various times and it has supplied the basis for defending the industry along certain lines. The particular difference is that, while much merchandise is priced on a market value, automotive products always have been priced on a cost plus basis.

In beginning a consideration of this question, it is interesting to note that the prices of automobiles have never been "cut" in dull seasons or when sales needed stimulation. Until the war changed conditions, price reductions accompanied periods of large sales and of large production. They were brought about chiefly by improved production methods.

So, in considering price adjustment at this time, these points must be considered:

The cost of materials.

The cost of labor, both as to wage and willingness to work:

The influence of a lowered price on selling—this is a question of meeting the psychological phase of the situation.

An inquiry put before the industry by The Class Journal Co. within the last few days, indicates that:

The cost of material is somewhat easier.

Labor is still seeking wage advances but is giving better production.

It probably would help selling somewhat to adjust, by lowering, the price of automobiles to meet the present state of public opinion.

It would be bad for the the entire industry to "cut" prices in the manner that other merchandise has been "cut" because of an "oversupply."

The manufacturer who lowers his prices should justify this to the public just as he justified his advances when conditions forced that move.

But, getting back to the beginning and explaining

how these conclusions were reached. A telegraphic poll was made of twenty manufacturers of fixed types of cars.

Replies were received from fifteen. Rather strange to say, three of those who did not reply are accounted among those who are apt to lower their prices quite unexpectedly. This may or may not be a basis of suspicion as to the attitude of these companies. One very heavy producer was non-committal in his reply. Of the fourteen remaining, all disclaimed any intent to lower prices and all cited high prices of materials and labor as reasons for not lowering prices.

One manufacturer reported that his product had been advanced less than any other on the market and, consequently, he ought to be the last to cut, or words to that effect. At all events, he was not going to cut now. Another interesting reply was from a well financed manufacturer who feared that some less fortunate brother might lower his prices to "get needed money."

This is an analysis of the replies. The reading of all the replies forced home the conviction that they did not mean very much, and, looking at the problem from another angle, how could the manufacturer say anything other than he did? Now let's forget the wasted energy.

Each of the manufacturers who replied—except one—mentioned the high prices of materials and labor. Several indicated that they thought a further increase in prices was unavoidable. Now, consider the question of a price increase.

Efficiency in Production

It is common talk in the Detroit district that, since the cut of about 15 per cent in working forces at the various factories, production has been maintained at the same rate as previously. This comment may, or may not, be correct, but it is unanimous and we cannot go back of it. There is no discussion of how or why this is true. It might not bear analysis but it comes from some of the factories that are included in the price survey.

In his paper at the semi-annual meeting of the Society of Automotive Engineers, A. F. Knobloch, of the Cleveland Tractor Co., described in considerable detail how that company had been working with its labor and how within 18 months it had increased the efficiency of its working force from 62 per cent of normal to 150 per cent. Of course, the increase above normal was paid for, each workingman being compensated for what he did above the 100 per cent task, but this is the cheapest wage the manufacturer pays. Also, by close attention, the wastage had been greatly reduced.

There is but one result of such work—the lessened labor cost of the product. It would appear that there is much to be considered in the cost of labor besides a mere quotation of the wage rates and that the manufacturer who is not reducing his labor cost is not doing justice to his product.

Another important item of the cost of labor to be considered is that of better production methods. It has been the salvation of the automotive industry that it has bettered production methods at such a rate that, despite the increased quality of the product, and the increase of equipment for the advantage of the owner, the price has—in the main—decreased rather than increased.

Conditions during and following the war have changed the curve somewhat but, some day, it must be drawn as a continuation of the original. The manufacturer who is not now cutting the cost of his product by better methods, is not giving his salesman a fair chance to meet the market conditions of the day.

As to materials: At the recent meeting of purchasing agents in Cleveland, it was said without dispute that the market was softening. It was freely admitted there that some of the high costs of materials had been due to the employment of too many stock chasers. Also that many companies were almost bidding against themselves. It was the belief of the purchasing agents that by a return to saner methods, they could bring about a buyers' market. We have no reason to dispute such statements, as they were not disputed by the men at this meeting.

The Raw Material Situation

Some raw materials are cheaper; some are dearer. Coal is high and may be higher. It may not be obtainable at any price. Some prophets say so. Rubber is cheaper, but cotton offsets the saving with a higher price. Copper is cheaper but steel will not be cheaper before October, if then, according to the men who make and sell the steel. So materials probably will not be much cheaper soon, unless it be textiles. There has been a collapse of that market, but such saving is not material. Glass probably will not be cheaper until the first of the year. The manufacturer may be right in his prediction. but is it good business to advance his product on the belief that his materials will be higher? Would he call it good business to lower his price on the prospect of cheaper materials?

One manufacturer said in his telegram that a cut in prices would stop all buying as the public would wait for further declines.

There he left the realm of physical problems and entered psychology. This is the salesman's province and, happening to know a manufacturer who is by training and experience a salesman, we put the question to him. It is fair to say that this man runs a factory that makes a part entering into every automotive vehicle (we do not mean that his factory has a monopoly) and he is interested in the selling of automobiles because the sales of cars automatically makes sales for his product.

It took a long time to get his answer to the question. He put it in the back of his mind and we talked of many things—of children, the late spring, farming, how automobile salesmen behave, factory methods, the S. A. E. meeting, and prohibition—before he answered. Especially did we talk of the recent 20 per cent discount sales of wearing apparel and of manufacturers' outlet sales. The man to whom the question was put said all of these things were important as bearing on the question asked. Finally he said:

"Your man is wrong. It would not stop all of the buying but, in my belief, it would be a good thing.

"As I see selling, there always is the question of supply and demand. It is true that the demand may be psychological rather than actual, but it is there. Just as it is in the mind of practically every man and woman to own an automobile sometime, whether they can afford one at present or not.

"Just now the psychology of the demand is for lower prices. Stop to think over recent events. Perhaps, the story is true that some of the recent big discount sales were due to a choice offered by the Department of Justice between arrest and a general price "cut." But whether it is true or not, the public bought at the discount. The public is still buying. The public is not waiting for further discounts.

"I think the answer is there. The public is expecting lower prices on everything.

"I have been preparing our people here to realize that we must shade our prices. Our raw material is not

cheaper. Fuel is getting worse. But we are going through our factory improving systems, putting in new machinery and using every possible method of speeding up our labor with a view of lowering the cost of production so that we can meet what we believe is the demand for a lower price.

"Then, just as we defended our necessary advances months ago by citing the advances the car manufacturers were making in their products, so we believe that the price of cars must come down as parts come down to help maintain our market. We can sell automobile parts only as automobiles are sold. We have no direct appeal to the public.

"This industry must function as a whole, and it must have a fairly standardized method of reasoning to its conclusions.

"The parts makers sell their products to purchasing agents who, in the main, are well informed as to cost of materials and as to labor conditions. It stands to reason that only occasionally can a parts manufacturer put anything over on his customers. Some of the newer parts makers have been getting a 'market price' for their products because of a scarcity when they came into production. But this is short lived. Now they must come down to the cost plus system. It is right and just that they should.

"And with the parts makers, on a cost plus system, as most of us are, it is only justice that the vehicle maker should come to the same method in fairness to us."

The above illustrates the view of one of the shrewdest (so we are informed) salesmen connected with the industry.

To any one who has reviewed the situation, there appears another point. Within our own circle, we are talking of softening prices and better production from labor. But when we talk about selling prices, we see differently. We can't do that and get away with it. We must talk the same out of the meeting as we talk within it. Do what you may, the truth will prevail. If we are to talk lessened cost among ourselves, we must not talk increased cost outside.

Now the conclusion:

The automotive manufacturer should price his vehicles by a carefully computed cost plus study. His profit should be ample for earnings and risk protection. If, when he places this price, he finds that his vehicles are priced higher than those competing for sales, he should study his cost sheet and learn wherein he is not doing as well as his competitors. He also should study well his sales system to eliminate waste or loss. But above everything else:

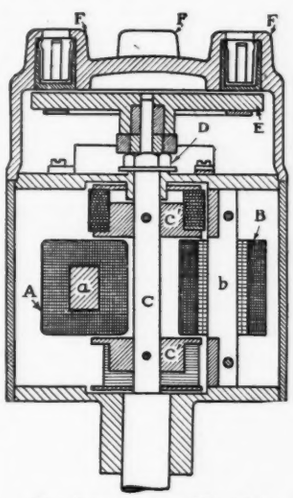
HE CANNOT AFFORD TO "CUT" PRICES—BUT HE MUST ADJUST THEM TO THE TIMES AND CONDITIONS.

An Alternating Current Battery Ignition System

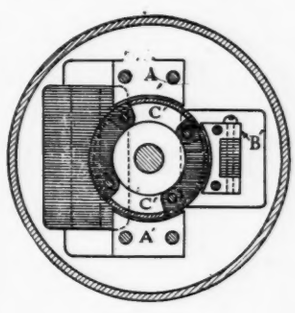
ONE of the differences between magneto ignition and battery ignition, as the systems are usually worked out, is that succeeding sparks with the magneto system pass in opposite directions, whereas with the battery system all sparks are unidirectional. A battery ignition system which partakes of some of the qualities of the magneto system has been developed by James M. Wilson, an ignition expert, who for several years was connected with the Splitdorf Electrical Co. Mr. Wilson's ignition equipment essentially consists of a magnetic circuit, one part of which carries an exciting coil connected in circuit with the battery, another part of which carries a primary and a secondary winding, corresponding to the windings of an ordinary ignition coil, and a rotor between these two parts of the magnetic circuit, the poles of the rotor co-acting with poles of the two parts of the magnetic circuit so as to periodically reverse the flow of magnetic lines through the ignition coil. This reversal of magnetic lines causes the induction of a current in the primary of the ignition coil which is normally short-circuited. When this current has nearly attained its maximum value, the circuit is broken by the usual interrupter, a condenser across the interrupter terminals helping to insure a quick cessation of primary current flow. The resulting abrupt decline in the flow of magnetic lines through the ignition coil induces in the secondary winding a high electro motive force which produces the spark at the spark plugs.

The current consumption of this system is given as 1 amp. Among other advantages claimed for the system is unusual accessibility, every part of the device being get-at-able without taking the ignition unit from the car. The ignition unit can be converted into an induction type of magneto by substituting a pair of permanent magnets for the battery exciting coil. The lower end of the rotor shaft engages with the timing gear shaft, and from the upper end the interrupter and distributer are driven, these parts being made with the spark generating device.

Mr. Wilson has also invented a battery cut-out switch in which the contact carrying spring is not acted upon directly by the magnetism of the electro-magnet.



Sectional assembly views of Wilson ignition unit. A, exciting coil; a, core of exciting coil; A'A', poles of exciting coil core; B, ignition coil (primary and secondary); B, core of ignition coil; B', pole of ignition coil core; C, rotor shaft; C'C', rotor poles; D, interrupter cam; E, distributer disk; FFF, distributer terminals



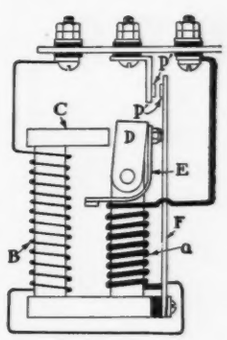


Diagram of Wilson cutout. A, series winding; B, shunt winding; C, pole piece of core; D, armature; E, armature spring holding cutout contacts open; F, spring blade carrying movable contact point P; P, stationary contact point

New Aircraft Engine Developed from the Liberty Twelve

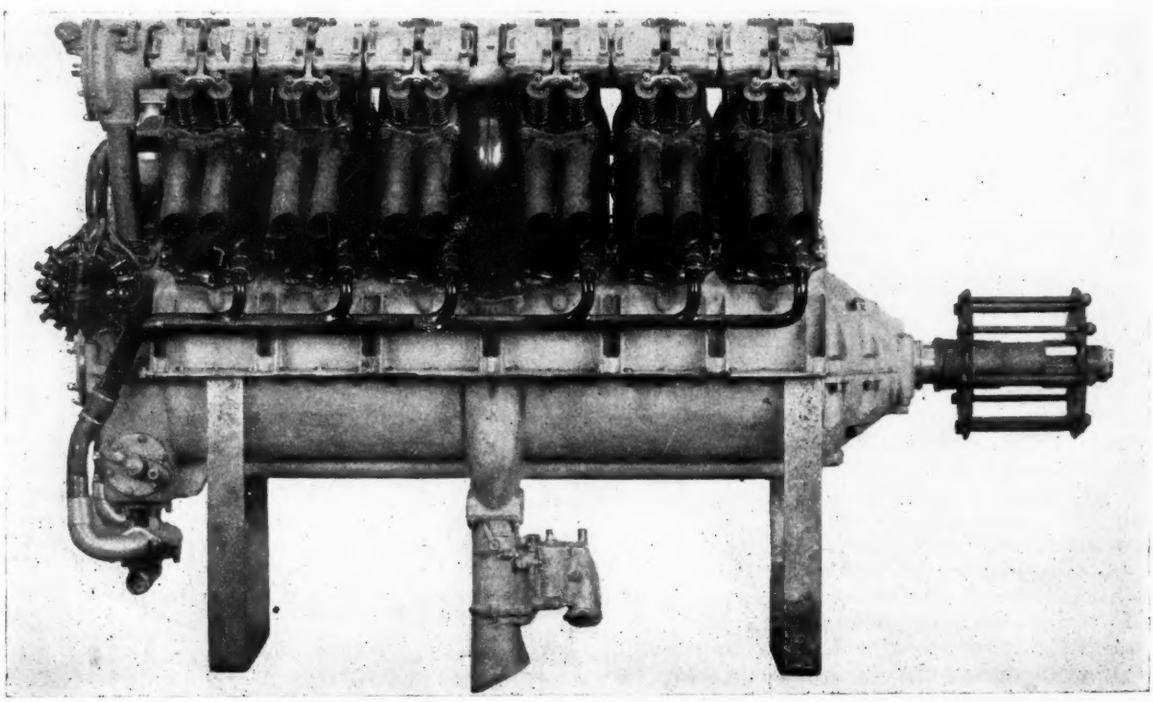
A 500-600 hp. engine with four valves per cylinder designed for high speed work. One of these engines will probably represent the United States in the Gordon-Bennett race this fall. The carbureter is below the crankcase and all the wiring and piping has been carefully planned.

A NEW 500 to 600 hp. twelve-cylinder design, known, from its displacement, as the "2025," has been developed by the Packard Motor Co. This engine, which is in its final stages of development, completes a line of three standard Packard airplane engines, which will be incorporated in planes developed by the government and elsewhere. In announcing the new engine, the Packard company states that for the present it will not manufacture airplanes commercially, but will only build such experimental planes as are necessary in testing and improving engine installations for the purpose of simplicity, accessibility and reliability. One of the objects of installation development is to eliminate a great part of what Col. J. G. Vincent, who is in charge of this development, termed "plumbing." He states that the present installations of engines in airplanes are in about the same condition as engine installations in automobiles were about 15 years ago, and a great amount of piping, wiring, etc., needs to be cleaned up.

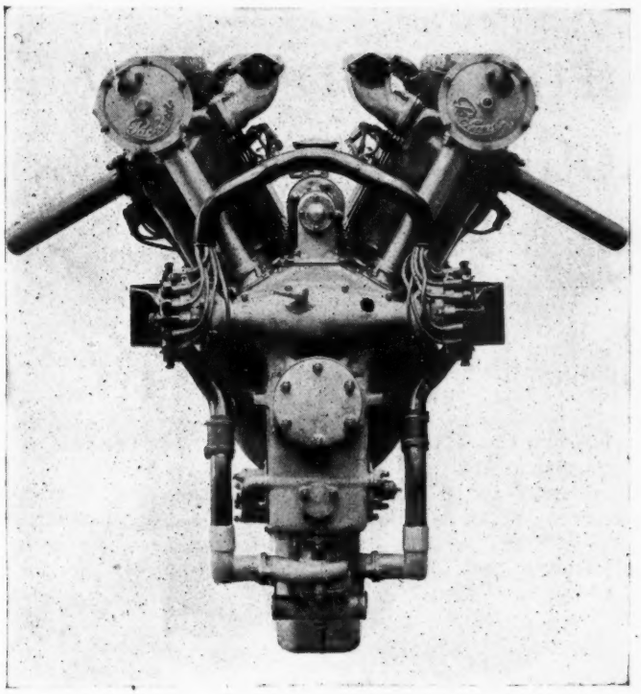
The new engine, while incorporating a number of unusual and highly interesting and mechanical features, is not a radical type by any means, but is very much along the lines which have proven successful in the Liberty engine and in previous Packard engines. It is particularly designed for quantity production methods. It weighs about 1.94 lb. per hp., and it is expected that it is capable of propelling a plane at least 200 miles an hour. It is very probable that the American entry in the Gordon-Bennett airplane race in Paris will incorporate one of these engines.

Among the improvements incorporated in the engine is a thorough system of fire-proofing obtained by placing the carbureter below and outside of the crankcase with all vents outside the cowling so that the dangers incident to backfiring are eliminated. This arrangement also permits of gravity feed, thereby eliminating the feed pump and piping, and making the carbureter more accessible. The carbureter is a single Duplex type, in place of the usual two carbureters on this size engine, thereby doing away with the difficulty of synchronizing the throttle and altitude controls. The carbureter is also provided with the Packard fuelizer, which is regarded as a safety feature, because it is always possible to start the engine after it has been cooled by a long dive.

The engine has four valves per cylinder, two intakes and two exhaust. The twelve individual steel cylinders



Side view, showing exhaust and intake manifolding with underneath single Duplex carbureter, of Packard 2025 aviation engine



Front end view of Packard 2025 aviation engine, showing installation of Delco ignition

are set in groups of six at an included angle of 60 deg. They are 5¾ in. bore and 6½ in. stroke, with a compression ratio of 5 to 1. The total piston displacement is 2025 cu. in. The weight dry is 1118 lb., and the weight with radiator and water is 1356 lb. The engine developed 400 hp. at 1265 r. p. m.; 500 at 1570 and 585 at 1925. It is estimated that it will be in excess of 600 hp. at 2000 r. p. m.

This engine is the fourth and most powerful developed by the Packard company. The others are an eight-cylinder Vee developing 180 hp. at 1600 r.p.m. and called the 1-A-744, as it has a 744 cu. in. piston displacement. A twelve-cylinder Vee called the 1-A-1116 and developing 270 hp. The third is known as the 1-A-1650 and develops 420 hp. at 1750 r.p.m. This engine is practically identical with the Liberty 12A. The line is now fairly complete and provides power units for all classes of aircraft. Further developments will undoubtedly be made in the direction of increased reliability and economy as well as reduction gearing for the propeller and starting apparatus. A strong family resemblance is evident throughout this series.

IN grinding engine crankshafts, the cost of the diamonds for dressing the grinding wheel and the wages of the wheel dresser are important items of expense, and it is therefore important that the fillets on the crankshaft be made all of the same radius, so that the amount of dressing required may be reduced to a minimum.

Four-Wheel-Drive Tractor for Industrial Use

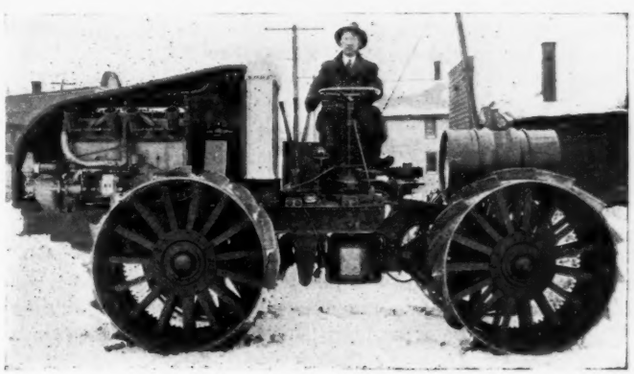
A NEW four-wheel-drive tractor has just been put on the market by the Rogers Tractor & Trailer Co. It has been designed and developed for use in logging camps, mines, oil fields, and other industries where there are insufficient or no transportation facilities. Its features are its power, four-wheel drive and its flexibility. The machine will turn in a 16½-ft. radius and negotiate comparatively large obstacles.

The engine is made by the Buffalo Gasoline Motor Co. It has four cylinders of 6¾-in. bore and 9-in. stroke and delivers 98 hp. at 850 r.p.m. It is equipped with magneto ignition and a governor. The radiator is mounted in the rear of the engine. The hood slopes from the top of the radiator to the front of the frame and has no openings. A Detlaff multiple disk clutch, designed for use in this tractor, is employed. Sliding gear transmission of their own make is used giving two speeds forward and two speeds reverse, allowing equal speed in either direction.

The rear wheels, with their axle and drive shaft, form a unit connected to the frame by a king pin. This king pin is midway between the front and rear axles. Steering is accomplished by a pinion acting on an internal gear segment fastened to the rear unit. The power is transmitted from the gearset to the drive shaft at the wheels through a gear box under the king pin and two differentials of their own make. Final drive is by a bull pinion and an internal gear on the inside of the rim of each wheel. There are no universal joints used. The rear unit is supported by two bearings on the gear housing, one small one near the gear box, and one large one near the drive shaft. The load from the rear unit is carried by one casting which has the two bearings just mentioned and works on the king pin.

The driver sits in the middle of the machine just behind the radiator and faces to the left instead of forward. The steering post is vertical and connects with the steering pinion and segment through a short shaft and bevel gears. At the driver's right hand are three levers for the gears and a pedal for the clutch. The driver has clear vision all around, a very useful requisite for work in congested or difficult areas. The cylindrical fuel tank is mounted on the rear unit and is connected to the supply pipe on the frame by a length of rubber tubing. All four wheels are 48 in. in diameter, have a 24-in. face and are fitted with fifteen 3 x 3 x 7/16-in. lugs to insure traction. The total weight of the machine is 15,000 lb. The frame is very heavy and of channel section. The axles are quite large and of square section.

In this tractor the feature of flexibility is especially well worked out and one set of wheels can be tipped at one angle and the other set at the opposite angle without throwing any gears out of adjustment or causing any undue friction, it is claimed.



The Rogers four-wheel-drive tractor for industrial use

Only American Airplanes on New Mail Routes!

The airplane and automotive industry of this country should feel itself obligated to undertake the operation of the four new mail lines proposed by the government for commercial operation. Likewise, the postal authorities should not let contracts to any companies that are not American.

THE Post Office Department, by inviting tenders on July 10 on four aerial mail routes to be operated by commercial companies, has placed an obligation upon the automotive and airplane industry of the United States that cannot easily be denied or overlooked. Conversely, through this action, there is a similar obligation upon the postal authorities in that they should permit only American companies, flying American-made planes with an American personnel from top to bottom, to operate over these routes. Such domestic lines, from every consideration and from every standpoint, should remain American.

Details of the proposed extensions show that a total of 4490 miles will be flown daily over the four routes. These link Cleveland and Detroit, Pittsburgh and St. Louis, New York and Chicago and New York and Atlanta, and the distances are well in excess of the approximately 3500 miles flown daily by the present governmentally operated lines from New York to Washington, New York to Chicago, and Chicago to Omaha. New outlets will be provided for the air mail, thus speeding up business in the various centers touched, and many new cities will be included in the proposed network of lines. The United States, then, will be far and away the largest user of commercial airplanes, as it is even now with its present lines. This is a potent reason for believing that the proposed operations should be confined to America and Americans.

The aerial mail has been pioneered and developed within this country. Its first use was here, and to-day no other nation is maintaining lines that in any way compare with those of the United States. They have been developed here, brought up to their present perfection by American effort and it would seem obvious that they should be continued in the same way.

Much discussion has been indulged in recently concerning the production of American-made planes. Much has been written on the general theme that American airplane plants should be kept in operation. But no actual plan was evolved and the generalities of discussion seldom centered upon any definite field activities except military, for the planes that might be produced by the American factories. Now comes the Post Office Department with its proposals that such planes shall be utilized for certain, definite work, backed by a definite financial plan of payment. The opportunity confronts the factories.

Several proposals recently have been broached by interests other than American to undertake the operation of lines that in some instances parallel those of the mail lines. Out-of-date war material—the left-overs and discards of the military program—which could be obtained at a small price—were to be used, obstensibly by American personnel. Flight was to be attempted over these lines in conjunction with a sales campaign that would flood the country with others of those old and discarded planes. Congress took up an anti-dumping bill that, unfortunately, did not become a law and the way remained clear for importation of such machines in any quantity or at any price.

It may be that American companies, as has been charged, will be unable to meet the requirements set forth by the Postal Department or that the financial returns possible under the government tenders will not be sufficient to warrant such service. Those factors, of course, can be determined only by the companies themselves, but they should be given the first opportunity of proving or disproving that American companies cannot operate the lines. An American built and American manned airplane industry, with its fleets of commercial planes, should result from any plan of having the mails carried by non-governmental agencies. This does not mean that preferential financial arrangements—subsidies, in effect should be given to American companies. It does mean that the American industry is entitled to the first consideration and that contracts should be given to companies using foreign-made equipment or manned by others than Americans, only when it is clearly demonstrated that the domestic companies cannot perform the desired services.

The government operated mail service shows that such service can be operated efficiently, economically and reliably by Americans with equipment made in this country. There is no question but that several factories possess the facilities and have the engineering ability and knowledge to turn out in quantity the planes that are needed. The military records of our pilots and the civil flying that has followed the armistice are sufficient proof of ability in that direction, and it is an axiom that American business possesses sufficient powers of organization to undertake almost any sort of a commercial proposal.

Details of the proposed routes follow:

Cleveland-Detroit line. Air line 95 miles, to carry 1,000 lb. mail each way, leaving Cleveland before 5 a. m. (eastern time) and delivering mail to Detroit postoffice by 7 a. m. Returning, leave Detroit at 7.30 a. m. and delivering mail by 9.30 a. m.

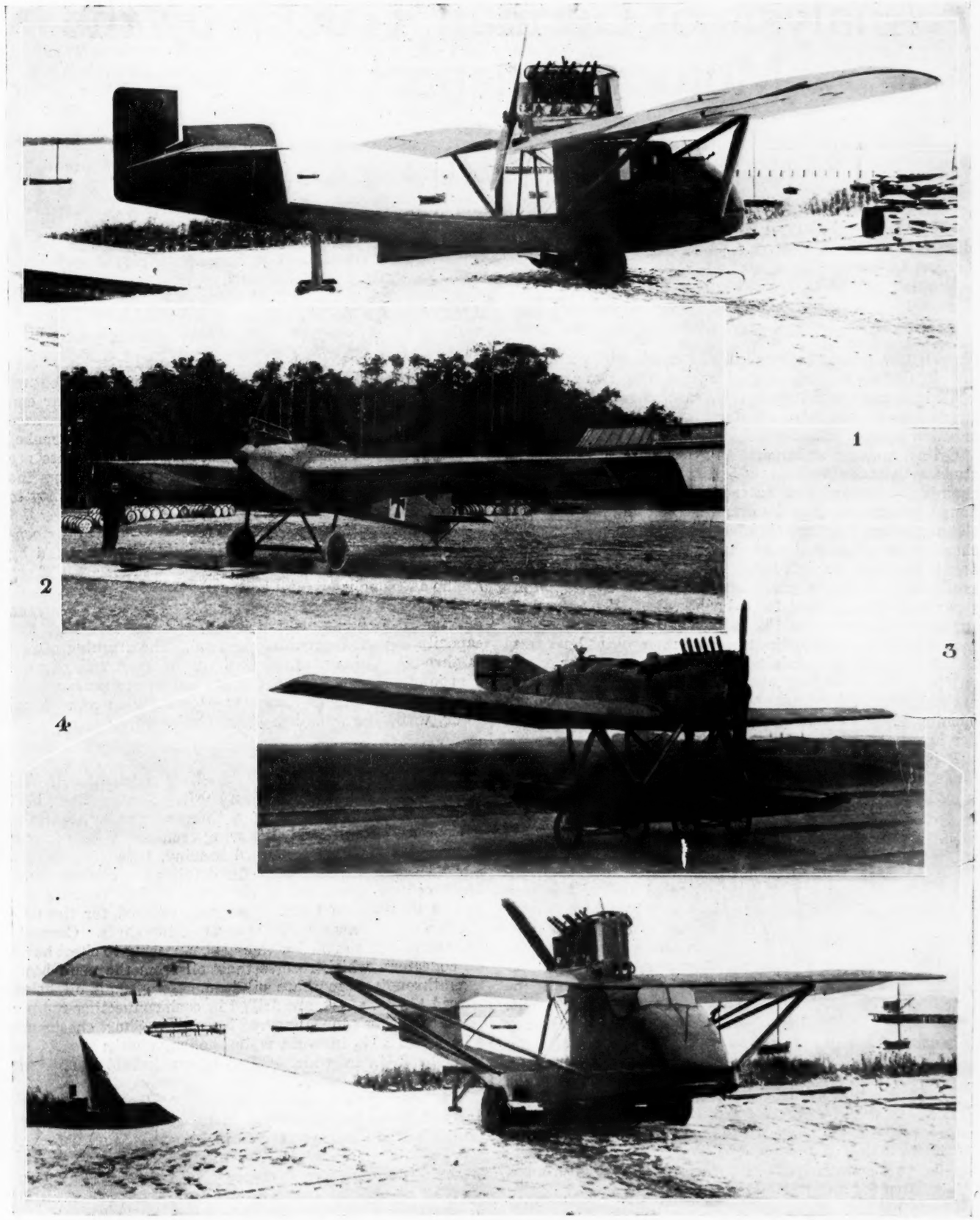
Pittsburgh-St. Louis line. Air line 600 miles, carrying 1,500 lb. mail each way. Leave Pittsburgh 9 a. m. (eastern time). Arrive Columbus 11.10 and leave 11.30. Arrive Cincinnati 11 50 (central time) and leave 12.10 p. m. Arrive Indianapolis 1.30 and leave 1.50. Arrive St. Louis by 5 p. m.

Returning. Leave St. Louis 9 a. m. (central time). Arrive Indianapolis 12.10 p.m. and leave 12.30. Arrive Cincinnati 1.50 and leave 2.10. Arrive Columbus 4.30 (eastern time) and leave 4.50. Arrive Pittsburgh 7 p. m.

New York-Chicago. Air line 735 miles, carrying 1,500 lb. mail each way. Leave New York 6 a. m. (eastern time). Arrive Harrisburg 8 and leave 8.20. Arrive Pittsburgh 10.30 and leave 10.50. Arrive Fort Wayne 1.30 p. m. (central time) and leave 1.50. Arrive Chicago 3.50. Returning, leave Chicago 6 a. m. (central time). Arrive Fort Wayne 8 and leave 8.20. Arrive Pittsburgh 1 p. m. (eastern time) and leave 1.20. Arrive Harrisburg 3.30 and leave 3.50. Arrive New York 5.50 p. m.

New York-Atlanta. Air line 815 miles, carrying 1,500 lb. mail each way. Leave New York 7 a. m. (eastern time). Arrive Washington 9.40 and leave 10. Arrive Raleigh 1.10 p. m. and leave 1.30. Arrive Columbia 3.55 and leave 4.15. Arrive Atlanta 6.55 p. m. Returning, leave Atlanta 5.30 a. m. (eastern time). Arrive Columbia 8.10 and leave 8.30. Arrive Raleigh 10.55 and leave 11.15. Arrive Washington 2.25 p. m. and leave 2.45. Arrive New York 5.25 p. m.

The Metal Airplanes of Germany



1—*Side view of Roland (Stralsund) passenger flying boat. This machine is radically different from the conventional type in many ways and the mounting of the engine and the shape of the cabin are worthy of close study.* 2—*The original Junker all-metal cantilever monoplane. Note the gas tank under the fuselage to be dropped in case of fire.* 3—*A two-seater all-metal seaplane fighter designed by Junker. It is similar to the land machines of the same designer.* 4—*Front view of the Stralsund machine*

Analysis of German Trucks by the Motor Transport Corps

This article continues the report on the trucks surrendered to the A. E. F. under the terms of the armistice. The results of the investigations and tests are being made public as rapidly as they are completed on each truck.

By W. E. Noakes

The Adler

THE engine is four-cylinder, L-head, 3 13/16 x 6½ in. Three-point suspension, suspension by two arms cast integrally with upper crankcase at rear end and by single support, mounted on starting crank bracket, which is bolted to front end of engine.

Cylinders are cast in pairs and held down by five ½-in. studs. Cylinder walls are ¼ in. thick, having slight chamfer at bottom and extend 2 in. below the bolting flange, protruding into the crankcase, having a 1-in. offset slot for connecting rod on offset crankshaft. Combustion chamber is slightly domed, having both intake and exhaust passages on left-hand side, which are clean and sandblasted. Single port for two intake valves, while separate ports are used for exhaust valves. The openings for these passages are 1¾ in. x 2 in. Valve guides are cast integrally with cylinders, having machined recesses at bottom ends for retaining valve springs. Water enters on the valve side just above bolting flange, circulates around valve and cylinder walls, rises and leaves through opening of cylinder water header, which is bolted to cylinder head.

Priming cups are located over exhaust valves, spark plugs over inlet valves. Exhaust manifold is of cast iron, having separate ports, and is held in place by eight long studs, which are screwed into the cylinder block. A gasoline air-pressure assembly is bolted to manifold between the third and fourth ports. The inlet manifold is of cast iron, ram's-horn shape, having two oblong ports. A cast-in water jacket is located around the neck of manifold with water connections to cylinder and water pump. Cylinder block on this engine is of good design, very lightly constructed, oblong in shape, width 8½ in. by 11¾ in. long. Outer surfaces are very clean and sandblasted. Two separate castings that conform to the shape of cylinder cover all the valves and springs from grit. These covers are held in place by a single stud and wing nut, and are easily removed in case of adjustments.

Flywheel and Crankcase

Flywheel is of steel, machined all over, 16½ in. in diameter, 4½ in. wide; flange is ½ in. thick, having six 2½-in. holes equally spaced for lightening of flywheel. Hub is 6½ in. in diameter and counterbored ½ in. deep for bolting flange on crankshaft. Flywheel rim is counterbored 3½ in. deep for an inverted type cone clutch.

Upper half of crankcase is of cast aluminum, lightly constructed, well designed and heavily ribbed for carrying crankshaft and camshaft. An oil pump assembly is mounted on a wide flange of the center bearing support, having oil leads connecting to a cast-in oil tube in the side wall of crankcase. Sub-oil leads run to all camshaft bearings and main crankshaft bearings. A peculiar feature of this case is that the timing gears are at the rear end of crankshaft just forward from the flywheel, the case being cored out for this peculiar arrangement, which makes a very poor service job when necessary adjustments are made. Two aluminum hand-hole covers extend on the camshaft side, which, when removed, allow accessibility to the camshaft and connecting rods.

The lower half of crankcase is of aluminum, lightly constructed, very deep, and the side walls are reinforced by two horizontal ribs extending across width of case. There are no oil troughs or false bottoms, as the oil pump extends to the bottom of case, drawing its oil through a screen and up through the body of pump, and into oil leads. Oil capacity in pan, approximately 4 gal. The draining of pan is through ½-in. plug, located in the rear end of pan. The joints of the upper and lower halves of crankcase are lapped. The bolting flange is 1½ in. wide and ⅜ in. thick, while the walls are ¼ in. thick.

Crankshaft and Bearings

Crankshaft is drop-forged, machine finished, with flywheel hub forged integrally on shaft. Crankshaft is held in place by four bearing caps, three of which are of the conventional type of three bearing crankshaft—the fourth is placed 5 in. from the third bearing, between which is located the crankshaft gear for driving the timing gears. Machined oil rings, one in the front of first bearing and one in the rear of fourth bearing, are used for the prevention of oil flowing off the ends of the shaft. Connecting rod pins are drilled with ends connecting to sheet brass oil collectors, which receive their oil from the main bearings through a separate oil lead. Two small oil holes, spaced 1⅛ in. apart, are drilled in each connecting-rod pin for lubricating connecting rod bearings. Short cheeks are 1 in. thick, 2 7/16 in. wide, while the long cheeks are 1¼ in. thick by 2 7/16 in. wide. Offset of crankshaft is approximately 1 in.

The bearings are babbitt lined, bronze backed, both upper and lower halves carried in upper half of crankcase. Lower half of bearing carried in a machined steel forged cap, held in place by two 9/16-in. studs. Both upper and lower halves have two L-shaped oil grooves running from chamfer at ends of bearing. No. 1 bearing is 1⅞ in. in diameter by 2 in. long; No. 2 is 1 15/16 in. in diameter by 2½ in. long; No. 3 is 1 15/16 in. in diameter by 1¾ in. long, No. 4 is 2½ in. in diameter by 1¾ in. long. Bearings have lap joints, no shims used.

Connecting rods are offset, drop-forged, I-beam type,

machined and finished all over. Cap is held in place by two 3/8-in. bolts. There are no oil holes or oil scuppers on lower half of rod. The small end of rod has two 1/4-in. slots cut through to piston pin for collecting the oil vapor to lubricate piston pin.

Bearings are babbitt lined, bronze backed, lapped joint, no shims used. Each half of bearing has two L-shaped oil grooves cut in center. Diameter of bearings 1 15/16 in. by 2 11/16 in. width. Piston pin bushing is of bronze, pressed in place, having two slots that are milled when assembled in place. Two U-shaped oil grooves connect slots on inner surface.

Pistons are of cast iron, having a domed head, and reinforced on the inside by a horizontal web, which connects to the piston pin bosses. Length of piston is 4 3/4 in.; the skirt is 1 3/4 in. long, thickness of skirt 3/32 in., having a 1/8 x 3/16-in. reinforced ring at the bottom. Four 3/16-in. concentric, compression, lap-joint piston rings are used. Piston pin is of steel tubing, located 2 1/4 in. from top of piston and held in place by round-head set screw and locked by cotter pin at one end, while the other end has a tapered boss 11/16 in. long, approximately 1/16-in. taper. Piston pin is 3 5/8 in long, 15/16 in. in diameter, 2 7/8 in. to tapered boss.

Timing Gears, Camshaft and Bearings

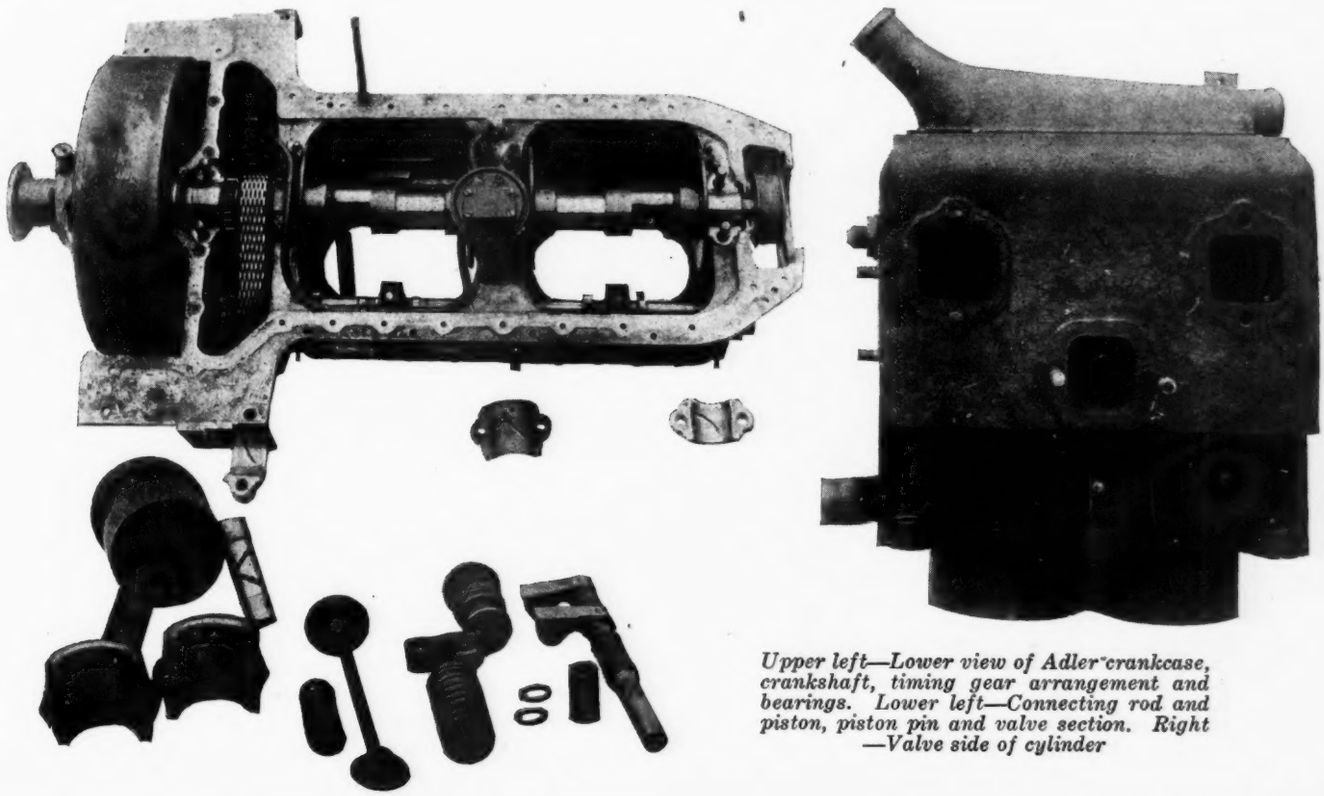
Timing gears are 2 15/16 in. in diameter, having 19 teeth, 5/16 in. deep, 3/16 in. at base of tooth, and having two faces. One is 1 3/8 in. wide for driving chain, mounted on camshaft gear, and the other is 1/2 in. wide for driving chain and magneto gears. They are of the spur type, steel forged and machined all over. Crankshaft gear is pressed on crankshaft, and held in place by straight key and lock wire. Camshaft and magneto gears are of steel, not hardened, machined all over. A vertical cross shaft is mounted in a machined boss of upper crankcase and is connected to a commutator, which is driven through spiral gears from magneto driving shaft. Links of driving chains are heavy, receiving no adjustment for tension due to wear and operation of engine. To remove camshaft gear, it is first necessary to remove camshaft which slides out through the front, and remove lock nut which locks gear on shaft.

Camshaft is a drop forging with cams forged integrally, 7/8 in. in diameter, machine finished, while cams are hardened and ground all over. Cam radius is 1 1/16 in. width of cam, 3/8 in. Valve lift, 3/8 in. Camshaft is mounted on five plain bronze bushings. The second and third bearings are mounted in reinforced webs, which support the upper face of the crankcase. These bearings receive their lubrication through cored-in oil wells placed above bearings.

Valves, Valve Tappets and Guides

Valves are of the mushroom type, crown head, 2 1/8 in. in diameter, thickness of head 1/4 in., length of stem 8 in., diameter of stem 3/8 in. The valve seating on the valve head is machined on a radii instead of the conventional type of chamfering. Width of radii is 3/16 in. There are two valve springs used—the inner one being 1 1/16 in. in diameter and 3 3/4 in. in length, while the outer one is 1 1/2 in. in diameter and 3 7/8 in. in length. These springs are held down by a machined steel cap and a 1/8 x 15/16 in. straight key fitting in an elongated hole on stem and locked in groove of valve spring cap. Valve caps are of steel with hexagon heads, machined all over, having a slightly concave body, forming part of the compression chamber in cylinder. Valves and springs are protected from dirt by cast-iron covers, which form part of the cylinder block.

Valve tappets are of the mushroom and roller type, with roller assembled on shaft, which bolts to side of crankcase, while the valve tappet with the mushroom head 1 1/2 in. in diameter with a slight radii on finished surface that rides upon roller assembly is held in a machined steel guide that is locked in crankcase by a steel dog. Valve stem is 3 7/8 in. long, slotted at top for adjusting wrench and having the conventional type of adjusting screw and lock nut in head.



Upper left—Lower view of Adler crankcase, crankshaft, timing gear arrangement and bearings. Lower left—Connecting rod and piston, piston pin and valve section. Right —Valve side of cylinder

This engine is used for passenger car or ambulance and is not governed.

Oiling and Water Systems

Oiling system is of the forced feed type through a gear-driven pump, driven through spiral gear mounted on the center of camshaft. The oil is taken from the lower half of crankcase, through the oil pump and forced into oil leads to the main bearings of crankshaft, camshaft and timing gears. The connecting rod bearings receive their lubrication from copper oil throwers that gather the oil from small oil leads, which connect to oil leads on main bearings, and pass into hollow crankpins on shaft through two small oil holes drilled into crankpins. Rest of the engine is lubricated by oil vapor caused by reciprocating parts.

Water pump is centrifugal, 6 in. in diameter, with bronze impeller and body, which has a two-bolt flange cast integrally and fitting on a machined boss on front end of crankcase. The impeller shaft is square at end and fits into a square hole milled in end of camshaft. The water inlet is 1⅛ in. in diameter, while the outlet is ⅞ in. This pump has an extra inlet with connections to water jacket on intake manifold.

Ignition, Carbureter and Fan

Ignition system is a single system, high-tension type ZR-4 Bosch magneto. Magneto is clockwise, with the customary advance by advancing the breaker box. For location of the secondary rotor a celluloid window is placed opposite contact No. 1 in the secondary distributor cover. The magneto is located on the right-hand side of the engine, and is driven by shaft and flexible coupling. The coupling is constructed out of thin, laminated spring steel.

Carbureter is a vertical Pallas type, 1¾ in., with a 29 mm. venturi throat. The float is of cork and shellac. The idle adjustment is by a stationary well. The carbureter is cast aluminum with no special features. The high speed is through a well running angular through the venturi, the fuel being restricted by a compensator. The throttle valve is a butterfly type.

Fan is 20 in. in diameter. Pressed steel blades riveted to pressed steel hub. Fan hub is mounted on an eccentric stud bolted to front cylinder block.

Weights and Remarks

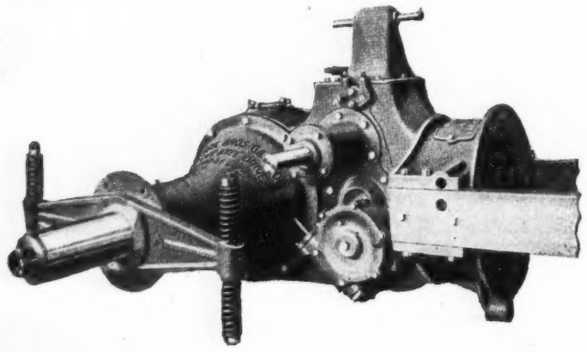
Connecting rod and piston complete, 8 lb.
Cam follower assembly, 6 ounces.
Valve tappet assembly, 1 lb. 4 ounces.
Valve, 11 ounces.
Valve springs, large, 4½ ounces; small, 2 ounces.

This engine, which shows peculiar design throughout, is not practical from a production or service standpoint. The crankshaft and camshaft are easily accessible for adjustments by dropping the lower crankcase. The engine must be torn down completely in order to repair or replace timing gears, which are located in a separate compartment just forward of the flywheel. The workmanship upon this motor is high grade, notably the cylinder blocks and crankcases. While the engine is lightly constructed the design does not follow American practice.

Three-Plow Tractor Transmission

A 30-hp., 3-plow transmission has been recently put in quantity production by the Foote Bros. Gear & Machine Co. This new model is known as the F. U. and is of the live axle type, being built along the same general lines as the 4-plow D. U. model now in extensive use.

The shafts are of high carbon steel and are mounted on Hyatt roller bearings which receive lubricant direct from the transmission reservoir. The gears are all made from drop forgings, hardened and machined. The clutch housing, which serves as the engine support, is integral with the transmission case. The steering gear is also included as a part of the case. All working parts are enclosed and the job is unusually compact. The design embodies the Foote planetary gear reduction. In order to meet the requirements of special designs a provision is made whereby different reductions may be obtained using change gears of varying diameter on the sliding gear and belt pulley shafts.



Foote standard transmission

Realizing the growing popularity of the farm tractor for belt work, particular attention has been given to the efficiency and accessibility of the power take-off. The belt pulley shaft is located 6 in. above the main center line, which ensures ample belt clearance. The complete Foote line for 1920 includes Model F. U., Model D. U., Model D and Model B.

Proposed International Standardization of Nuts and Bolt Heads

THE Swiss Standards Association has addressed a communication to the national engineering standardization bodies of America, Belgium, England, Germany, Holland and Sweden, proposing the international standardization of the widths across flats on nuts and bolts. The proposal covers the range of ¼ in. (6 mm.) to 3 in. (80 mm.) diameter of bolts. The numerical values proposed are a compromise between the United States Standard, the British or Whitworth, and the metric "Systeme Internationale." The communication says that the VSM-Committee of Standards is being urged by the Swiss industry and will be compelled to decide upon a system of widths across flats in the near future, but doesn't care to do this before one more attempt to bring about an international agreement in this matter be made.

The American Engineering Standards Committee has requested the A. S. M. E. and the S. A. E. to act as joint sponsors in the matter.

BULLETIN 49 of the Iowa State College of Agriculture and Mechanical Arts, at Ames, Ia., is a report of "An investigation of the protective values of structural steel paints."

Comparison of Kerosene and Gasoline for Heavy Duty Engines

Many engineers have stated that present engines must be redesigned to use heavier fuels. In this article are given the results of several tests which tend to show that carbureter and manifold changes would be sufficient to produce desired results. The subject is exhaustively discussed.

By P. S. Tice*

THE program of investigation of carburetion requirements of the Hinkley four cylinder 4.5 x 5.5 in. cylinder, heavy duty automotive engine, reported in part in the June 24 issue of AUTOMOTIVE INDUSTRIES under the title "Carburetion Requirements of a Typical Gas Engine," included an examination of its performance and requirements on kerosene fuel. The material here offered is a brief summary of results with this latter fuel, directly compared with the results on gasoline as reported in the former paper. All the results here discussed were obtained with the Stewart Heavy Fuel System.

Since the general characteristics are identical with the two fuels, this report is shorn of detail, in the interest of brevity, and only the more significant relationships are shown. The method of investigation and the observations made were identical, and the reader is referred to the earlier report for a full statement of these matters. Furthermore, since, as previously shown, engine speed has only a slight effect on requirements and performance, only the condition of 1000 r.p.m. is here discussed. The reason for the selection of this particular speed is that it is the one at which the engine tested is most likely to be governed in service.

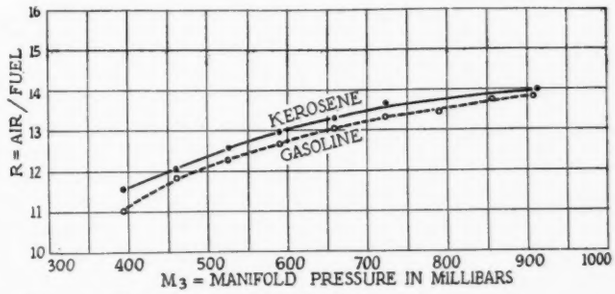


Fig. 1—How mixture proportions must vary to secure maximum utilization of fuel (thermal efficiency)

The writer holds no brief for any fuel or fuels, and is interested only in a presentation of what have been found to be the characteristic carburetion requirements and engine performances involved in their use. As a result of several years of close study, including extensive experimental investigation, he can only conclude that there is no occasion to enter upon what has been popularly and vaguely referred to as a "redesign of the engine" for the purpose of handling the heavy fuels. It seems that the great difficulty has resided in a general lack of knowledge of the conditions, and in consequent inability to satisfy them.

Mixture Proportions.—The curves of Fig. 1 very definitely show that for maximum thermal efficiency leaner mixtures must be used with kerosene than gasoline, in face of the fact that the true combining proportions (air : fuel) is smaller for kerosene. This requirement, it seems, is bound up in the general condition that the less volatile the fuel the greater must be the relative air content of the mixture to sustain an equally workable vapor content.

It is interesting to compare the relative temperature rises and vapor pressures in the charge for the two fuels. The curves of temperature rise (t_3–t), Fig. 2 are virtually expressions of the relative quantities of heat given to the charge in its formation, since the heat appearing as a temperature rise is directly as t_3–t, and the weight of air heated varies with the manifold pressure. Furthermore, the difference in scale positions of the t_3–t curves very approximately expresses the known difference that exists between the heats of vaporization of the two fuels. It appears that the total heat of vaporization of the gasoline used is about 56 per cent that of the kerosene.

Vapor Pressures.—In the absence of separate and direct determinations of the vapor pressures of the two fuels, as related to temperature, it is impossible to state the relative saturations that obtained. On the other hand, comparison of the vapor pressure values of Fig. 2, under the condition of maximum manifold pressure, with the meager data that have been published for similar fuels, saturation is to be expected, considering the mode of charge formation and the proportion of the charge.

The percentage relationships between the partial pressure of the vapor and the total pressure in the intake system are presented in Fig. 3, the points of which are computed from those of Fig. 2. The chiefly interesting thing about this graph is the straight line relation shown to exist over the greater and more important part of the range of pressures. A further point is the almost exact parallelism of the two sets of observations, the apparent constant difference being 4.5 per cent.

In Fig. 3 we have an expression of the order of variation of apparent volatility with pressure, which is useful because of the practical non-existence of published data of this sort. It seems that here we also have something describing the reason for the universally experienced improvement in engine performance resulting from a reduction of manifold diameter in conventional intake systems. Since the pressure is directly as the area, a

*Director of the Carbureter Division, Stewart-Warner Speedometer Corp.

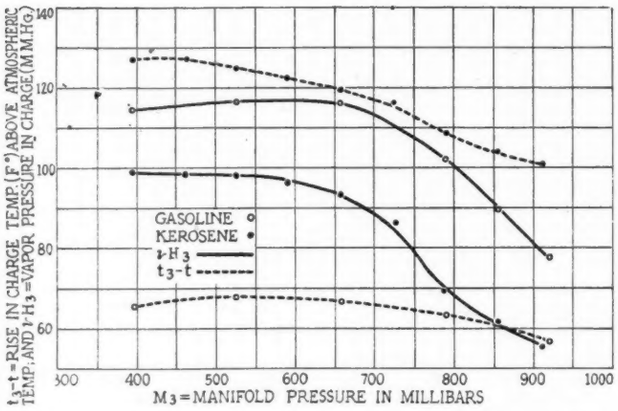

t3-t = RISE IN CHARGE TEMP. (F°) ABOVE ATMOSPHERIC TEMP. AND ν H3 = VAPOR PRESSURE IN CHARGE (M M HG.)
GASOLINE
KEROSENE
ν H3
t3-t
M3 = MANIFOLD PRESSURE IN MILLIBARS

Fig. 2—Relative vapor pressures and temperature rises in the Stewart heavy fuel system. (1 *millibar equals* 0.001 *of a standard atmosphere*)

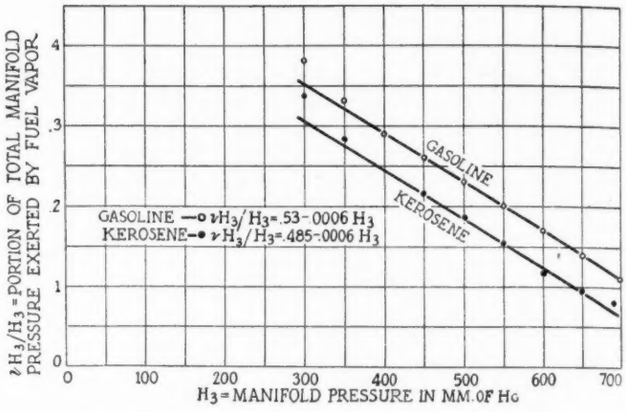

ν H3/H3 = PORTION OF TOTAL MANIFOLD PRESSURE EXERTED BY FUEL VAPOR
GASOLINE —o νH3/H3=.53-0006 H3
KEROSENE—• ν H3/H3=.485-0006 H3
GASOLINE
KEROSENE
H3 = MANIFOLD PRESSURE IN MM. OF Hg

Fig. 3—How the vapor content of the charge varies with the intake pressure

reduction area will in itself account for an appreciable increase in the vapor content of the charge.

Relative Utilization.—Aside from all else, when one talks of kerosene as an engine fuel, the uppermost idea is that one of reduction in operating cost. Whether this is brought about as a natural result of the increase in the available supply of fuel, or by virtue of the lower cost per unit of kerosene, is immaterial.

We have in Fig. 4 a statement of the possibilities in engine performance on the typical fuels of the two classes. This, taken together with purchase prices, depicts what can be accomplished in reduction of operating cost, and indicates the price that must be paid in engine output to bring about that saving. It is thought Fig. 4 goes a step farther than just this, in that it points a way to minimize the reduction in possible output that is now suffered when kerosene is substituted for gasoline in an engine. The major portions of the curves of Fig. 4 need no discussion, since their message is an obvious one. As the maximum output is approached closely, the situation is not so obvious, although it is capable of plain statement, and, it seems, is amenable to an equally plain remedy.

Combustion.—For any fuel there is a set of definite combinations of charge proportion, charge pressure and charge temperature, each one of which is critical with respect to the manner in which combustion progresses. On the one hand we have, at sub-critical combinations, a "normal burn," which can be used very comfortably; and on the other we have what we are pleased to call "detonation," which cannot be used to advantage.

The obvious distinction between normal and detonative combustion is one of rate at which combination occurs. A detonative combustion is almost always accompanied by weird and alarming noises in the engine, resulting from the then abnormally high rates of pressure rise. While the audible evidence is almost exactly the same in the cases of preignition by too early spark, preignition by autoignition and in detonation, the three general conditions are distinguished by several things:

(a) Preignition by too early spark is fully corrected and combustion rate made normal by a return to normal ignition timing. (b) Preignition by autoignition is wholly out of control with respect to time of occurrence of the spark. (c) Detonation is characterized by an abnormal rate of pressure rise occurring in the midst, as it were, of an apparently normal rise resulting from a normal timing of the ignition. Delaying the ignition exercises a control upon detonation, but an apparently normal rate of combustion is attained by this means only when the ignition is so late as to result in a material loss of output.

Combustion of Heavy Fuels.—Under the conditions of engine operation, both advanced autoignition and detonation are more readily induced with the heavier petroleum fuels than with the lighter, because of the relatively much lower ignition temperatures of the former, and because of their greater content of unsaturated compounds of high molecular weights. Thus, it is no uncommon thing to have uncontrolled autoignition followed by detonative combustion in operation on kerosene. In fact, with kerosene and like heavy fuels, it may be taken as fundamental that premature autoignition is accompanied by detonation; although detonation may follow a normal and controlled ignition, as previously noted.

Controlling Factors in Detonation.—In the absence of exact knowledge of the inter-relationships of the three variables noted as of importance in inducing the critical condition of detonation, it will suffice to express the general influence of each upon the others. (1) Considering the mixture proportion as fixed, and the pressure or temperature, or both, to be increased to induce detonation, the border will be passed earliest with mixtures in the immediate neighborhood of the true combining proportion. (2) Considering charge proportions and pressure to be fixed, detonation is induced by a sufficient rise in temperature. (3) Considering charge proportions and temperature to be fixed, detonation is induced by a sufficient rise in pressure. (4) Charge temperature is the most important factor, and requires the strictest control, since premature autoignition depends solely upon the temperature, and *must* be avoided.

Compression Ratio Limitations.—In the conventional engine cycle, the things that must be done to build up the thermal efficiency unfortunately make our control of the charge temperature a narrow one—particularly so with respect to the requirements of the heavy non-volatile petroleum fuels. In order to be able to use these latter fuels at all, it is necessary that the charge entering the cylinders exist at a higher temperature than in the cases of lighter fuels. This, considered together with the lower ignition temperatures of the heavier fuels, places a very serious limitation upon the compression ratio that can be employed, and still avoid premature autoignition.

But, while thermal efficiency is considered a function of the compression ratio, it is that only in so far as the compression ratio controls the temperatures of the cycle. Thus it is readily conceivable that, in the use of two fuels involving similar temperature cycles normally occupying different positions on the temperature scale, an

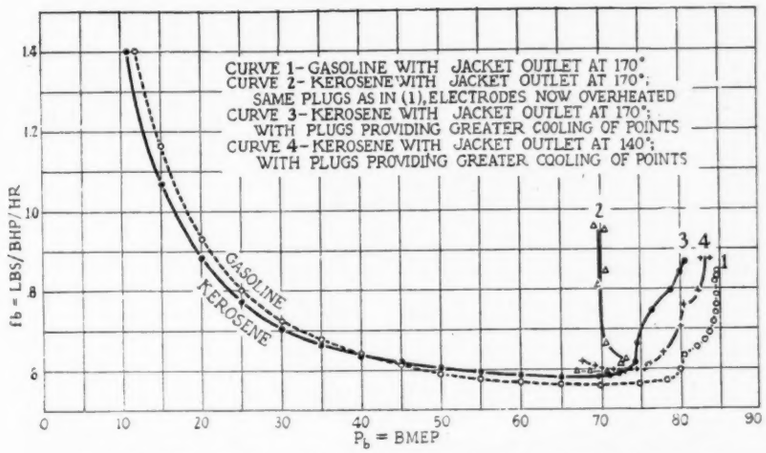

CURVE 1- GASOLINE WITH JACKET OUTLET AT 170°
CURVE 2- KEROSENE WITH JACKET OUTLET AT 170°; SAME PLUGS AS IN (1), ELECTRODES NOW OVERHEATED
CURVE 3- KEROSENE WITH JACKET OUTLET AT 170°; WITH PLUGS PROVIDING GREATER COOLING OF POINTS
CURVE 4- KEROSENE WITH JACKET OUTLET AT 140°; WITH PLUGS PROVIDING GREATER COOLING OF POINTS
GASOLINE
KEROSENE
fb = LBS/BHP/HR
Pb = BMEP

Fig. 4—Comparison of maximum utilizations under the same external conditions in the same engine

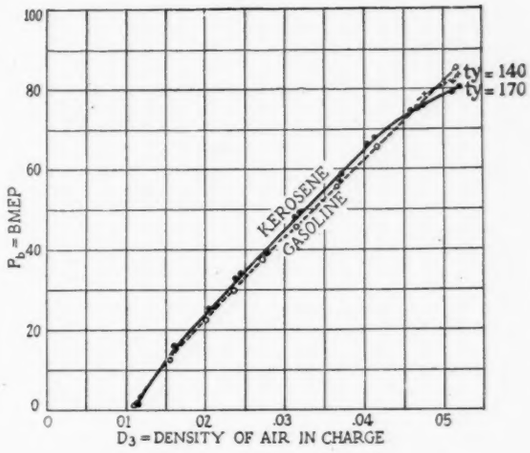


Fig. 5—Maximum outputs on the basis of quantity of working fluid pumped by the engine

almost equal thermal efficiency can result even though the compression ratios are quite widely separated in the two cases.

Turning again to Fig. 4, it will be noted that three sets of points, numbers 2, 3 and 4, are given as representing open throttle performance on kerosene. For each individual group of points the pressure and temperature of the charge were substantially constant, the proportion being the prime variable. Also, the charge pressure was substantially constant for all three groups of observations, as was also the charge proportion range covered, leaving the charge temperature as the prime variable between groups.

Premature Autoignition.—In the case of curve 2, local overheating resulted in premature autoignition as soon as the mixture was enriched to 14.68, the ratio represented by the first point beyond the last apparently normal one, at which the ratio was 15.85. A simple change to another set of spark plugs of somewhat superior design, resulted in the points of curve 3. Here again, the first departure from normal occurs at a mixture ratio of 14.52, the last normal point preceding it representing a ratio of 15.60.

It is notable that no recovery is shown in curve 2, following further enrichment; while a corresponding enrichment in the case of curve 3 results in a considerably increased output. Attention is further directed to the similarity in shape, from the point of break, of curves 2 and 3. In these two cases the only important difference lay in the extent of the local heating of the charge in the immediate neighborhood of the spark plug electrodes and insulator. The runs of curve 3 immediately followed those of number 2, and both entering charge and jacket water temperatures were identical.

The points of curve 4, Fig. 4, were observed in a set of runs involving a lowering of the jacket outlet temperature by 30 deg. F. (170-140). This change in condition resulted in a temperature of entering charge only three to four deg. F. below the values observed in groups 2 and 3. Thus the change in characteristic form, as between curves 3 and 4, is accounted for almost entirely on the ground of reduced local over-heating of the charge at those points at which such heating formerly occurred.

Detonation Without Autoignition.—The point of apparent break in curve 4 is at a ratio of 12.10, and seems to bear no relationship to the breaks in curves 2 and 3. However, the similarity between curves 4 and 1 is interesting, as showing the same characteristics at the same effective pressures and the same ratios of air to fuel. In neither case did premature autoignition occur, although there was evidence of detonation in both cases at the points immediately below the breaks.

In addition to the evidence of sound which accompanies detonation, there is the additional one of free carbon in the exhaust, which is unmistakable, in that it occurs with mixtures of such small fuel content that it cannot be confused with the result of over-richness. The loops in curves 4 and 1 clearly show the effect upon output, and hence upon specific fuel consumption, of this loss of a portion of the energy of the fuel supplied.

The end of this investigation has not as yet been reached, and work is going forward with this and other engines. The results to date, of which this material is but a representative fragment, seem to point with reasonable certainty to a complete relief of the situation through simple provisions in jacketing, and in dispositions of metal in pistons and valves, which permit of a more equable temperature distribution in the combustion chamber. Great promise seems to lie in the use of heavy aluminum pistons closely following the form used in the Liberty aircraft engine.

Maximum Output.—A further light on the comparative performance of kerosene and gasoline is offered in Fig. 5, a plot of the maximum outputs obtainable from the two fuels, against air density in the charge. On this basis, which ignores fuel consumptions, (they are, on the average, almost identical), it is seen that until one closely approaches the critical combination of temperature with pressure, the difference is slightly in favor of the heavier fuel. With suitable temperature distribution throughout the combustion chamber, there seems to be no reason to believe that the general difference would not persist.

Conclusions.—The general conclusions seem to be:

(1) The mixture ratio variation required with change in relative load is of the same order for all petroleum fuels.

(2) Slightly leaner mixtures are imposed by the heavier fuels.

(3) To provide an equal usable vapor content. The heat appearing in the charge as a temperature rise is in direct relation to the heat of vaporization.

(4) The relative vapor content of the charge is an inverse function of the charge pressure.

(5) Maximum thermal efficiencies are practically the same for gasoline and kerosene.

(6) Maximum outputs are practically the same for gasoline and kerosene, on the basis of the same quantity of working fluid.

The Automatic Milling of Connecting Rods for Production

It is estimated that 12,500,000 connecting rods will be required for passenger car production schedules this year. This article shows how they could be turned out on thirty-five machines working on a forty-eight-hour week. The machines are automatic, requiring but slight attention.

By George M. Meyncke

THE research department of a prominent machine tool concern estimates that for the 1920 passenger car production schedules a total of 12,500,000 connecting rods must be machined. One of the most important operations in the machining of these rods is the cutting of the cap from the rod proper and the facing of the bolt bosses. These operations are indicated in Fig. 1. This cap-cutting and boss-facing operation was studied from the viewpoint of the production engineer, and a machine, fixture and method were developed for handling the job.

According to the research department above referred to, "if the cap sawing and boss milling operation for the total production of 12,500,000 were concentrated in a single shop, it would require only 35 machines and 35 inexperienced operators, figuring on a 48-hour working week and a 50-week year."

The production engineer's problems are not confined to the matter of quantity per day. The utilization of the available labor reflects in output to a greater extent than the average man realizes. To solve this phase of the problem, the connecting rod milling machine shown in Fig. 2 was designed to function automatically. The operator's work consists only in removing finished work from the machine and replacing it with the unfinished rods. The operator is not essentially a skilled mechanic and he concentrates on one thing—keeping the machine loaded.

The production obtained depends upon the length of the piston pin bearing. Short bearings are produced at the rate of 180 per hour and long bearings at the rate of 120 per hour, with intermediate lengths ranging between these limits.

The fixture for milling the connecting rods, shown in Fig. 3, has 12 work-holding positions. The rods are shown

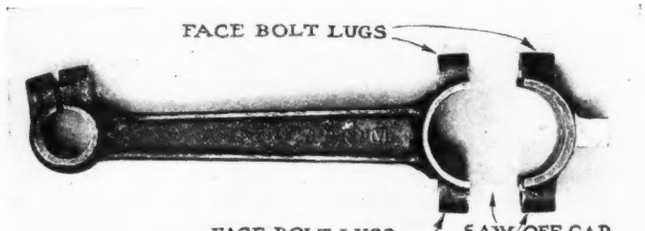


Fig. 1—Facing of bolt lugs and cutting off of cap

Fig. 2—Connecting rod milling machine

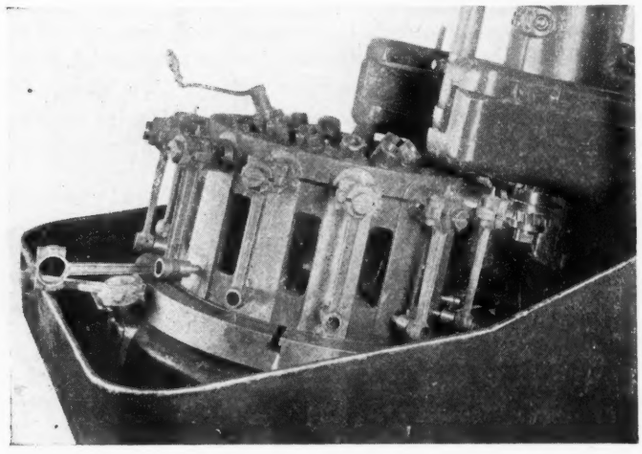


Fig. 3—Indexing fixture for milling connecting rod bolt heads

in two of these positions. The fixture is clamped to the table of the machine and the spindle carrying two side mills and a saw is fed half way between two adjacent rods, thus finishing the opposite sides of two rods at each movement.

At the end of the cut the cutters fall back rapidly, the table indexes one-twelfth of a revolution, and the cutting operation is repeated on two halves of the next two rods. Thus it will be seen that at each cycle of operation two half cuts are made and one complete rod is machined. The machine automatically goes through the feeding and indexing movements at the rate for which it is timed, be that 120 or 180 times per hour.

One valuable feature of this method is that only one set of cutters is required. This not only means a saving of cutter equipment, but because the same cutters mill both sides of the connecting rod, the surfaces are parallel and identical.

The fixture is universal in that if any change is made in the size of the pin bearings or even in the length of the rod by the engineering department, it only means a change in the location or size of the plugs in the fixture on which the work is located. The work-holding plugs are also arranged to adjust radially so as to allow the cutters to wear down in diameter an inch before it is necessary to replace them with new cutters.

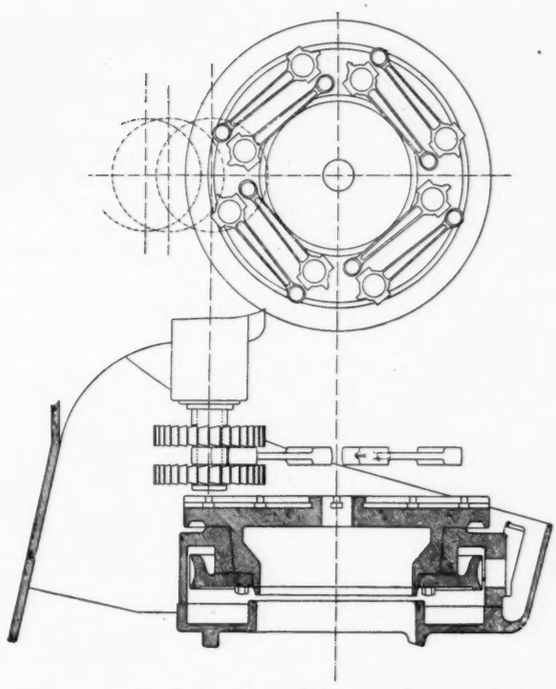


Fig. 4—Four station fixture for milling crank pin and piston pin bosses of connecting rod

The crank pin and piston pin bosses on a connecting rod may also be milled to great advantage on the same machine. Fig. 4 shows a layout of a four station fixture in which the cutter feeds radially over the table and straddle-mills two crank pin bosses and two piston pin bosses at a single stroke. The output obtained is 240 per hour. The fixture details are omitted in Fig. 4 for the sake of clearness.

This method can only be used when piston pin and crank pin bosses are the same length, and when used. The fact that the same cutter mills both bosses assures of their being accurately handled.

When the piston pin and crank pin bearings are of different length a "two-story" fixture is used, and two sets of cutters are carried on the arbor. Upper set straddle-mills the crank pin boss, the lower set the piston pin boss.

Measuring Vehicle Loads

THE problem of building new roads is closely connected with the problem of maintaining our present roads. The present shortage of labor and materials makes it difficult to get a staff to build new roads in addition to the staff required to keep the system in repair. One of the greatest sources of damages to roads is the overloaded truck menace. Many states have passed laws prescribing the permissible load per inch of tire breadth.

An instrument to assist county and state authorities to quickly measure the load on the wheels of a truck or other vehicle is manufactured by the Black & Decker Co., and called the Loadometer. It consists of a cylinder filled with oil on which a plunger acts. The plunger supports the rear axle. A screw jack incorporated in the head of the cylinder lifts the weight of the truck from the ground and allows it to fall on the plunger. A high pressure gage indicates the weight.

Two instruments are used—one at each end of the rear axle. The handles used to operate the jacking portion are detachable to allow easy transport.

Prominent at the S. A. E. Summer Meeting

George W. Dunham, Militor Corp. | W. P. Culver, Standard Parts. | Hugh R. Corse, Titanium Bronze | H. W. Alden, Timken. | R. L. Buckindale, Timken. | W. G. Wall, National Motors. | W. C. Cutler, Bethlehem Steel. | Col. Thurman H. Bane, Aircraft.

Accuracy Essential Feature of Crankcase Manufacture

Interesting methods to secure the utmost accuracy in the manufacture of crankcases have been worked out by a Middle Western concern. Investigation has proved that proper alignment of the crankcase lengthens the life of the bearings. The methods in use at this plant are described.

By J. Edward Schipper*

EXPERIENCED engine manufacturers know that of all the parts of an engine the crankcase requires the greatest degree of accuracy. Manufacturers of engines for passenger cars have thoroughly realized this and the result is that there have been some very interesting methods worked out in order to secure the utmost in this respect. One of the concerns which has made a particular study and devised some original means for maintaining accuracy in this important engine part is the National company of Indianapolis, Ind. This concern manufactures a very high-powered, overhead valve, six-cylinder car and makes its own engines. Crankcase manufacture has been made a matter of special study, and the methods described herewith are in use.

It has been found that proper alignment of the crankcase not only insures increased bearing life, but also has much to do with the performance of the clutch and gearset, inasmuch as they must be accurately aligned with the crankshaft in order to function at their best. Care commences immediately upon the receipt of the raw castings. These are checked by inspectors for cracks, etc., and are weighed with a variation limit to insure uniformity. After the preliminary inspection is passed, all these castings are sand-blasted to loosen all the core sand which adheres to them and they are washed in Oakite, an alkaline solution. The crankcase castings are dipped into this boiling solution and then rinsed in hot water. All of this is preliminary to the first manufacturing steps and is done to insure a clean product before the casting ever gets to a machine.

The first manufacturing step is a rough milling operation on the bottom of the case and on the bearing cap faces. For this operation the work is located from the surface of the flange and from the surface of the supporting arms on the casting. This is a three-point suspension operation, the casting first being located by a screw locating point and then by spring plungers which support the rest of the casting while the milling operation is going on. The machine used is a Becker vertical miller, and it takes off about ¼ in. stock on this rough milling operation.

The first rough milling operation on the bottom of the crankcase gives a surface from which to locate the other milling operations. These are conducted on a Beeman & Smith planer type miller with a long table enabling work on two crankcases to be carried on practically simultaneously; that is, while one is being milled the other is being set up. This second operation is to rough mill the top of the case, the location being from the rough milled bottom face. After this rough milling is completed, the casting is set aside for a week to cure before the finish milling operations are completed. The same Beeman & Smith machine is used for doing the finish milling, the jig being so arranged and the table and tools so set, that either side may be turned up and either rough milling or finish milling accomplished. Not only are the top and bottom of the crankcase finish milled on this machine, but also the bearing cap surface. The timing inspection boss on the flywheel housing is also milled on this machine, which holds the work in place by means of spring plungers and locates it from the bottom surface of the crankcase.

Following the rough and finish milling, all the holes for the oil pan cap screws are drilled simultaneously on a multiple spindle drill. Two dowel holes are also drilled at the same time, these matching holes in the oil pan so as to give interchangeability of crankcases and oil pans. It will be seen subsequently that, although a crankcase and oil pan are machined together in some of the operations, it is not necessary that the same oil pan be assembled to the finished crankcase, as the dowel holes and surfaces are accurately manufactured to give absolute interchangeability. The drill utilized operates forty-three spindles simultaneously and is a Natco multiple spindle unit. Outside of the multiple spindle drilling operation there are some individual holes, such as those for the cylinder hold-down bolts which are drilled singly. These are all jig operations, but are accomplished on a single machine, as they do not lend themselves readily to the use of a multiple spindle unit.

One of the most interesting operations is the following, which primarily locates the main and crankshaft bearings. The caps are assembled to the bearing and the cases bored for the crankshaft, camshaft and waterpump driveshaft bearings. The work is done on a remade lathe, the machine really being a special design of the National company and arranged to bore, flycut and ream all the bearings and to space the center main bearing. The flycutting operation is accomplished on a single pointed tool which, because of its requiring but a single setting and doing all the work, is more certain to maintain roundness than a multi-pointed tool. This insures alignment of the main and camshaft bearings.

It is, of course, essential, in order to maintain the roundness desired, that the crankcase be not sprung in any way by the boring operations, and to guard against this an exceptionally rigid, heavy jig is utilized. This is shown in Fig. 4. This jig weighs over 2000 lb., but is so balanced that it can be readily slid around the surface plate upon which it is mounted, with one hand. As the jig completely surrounds and reinforces the crankcase, there is no opportunity for spring during the cutting of

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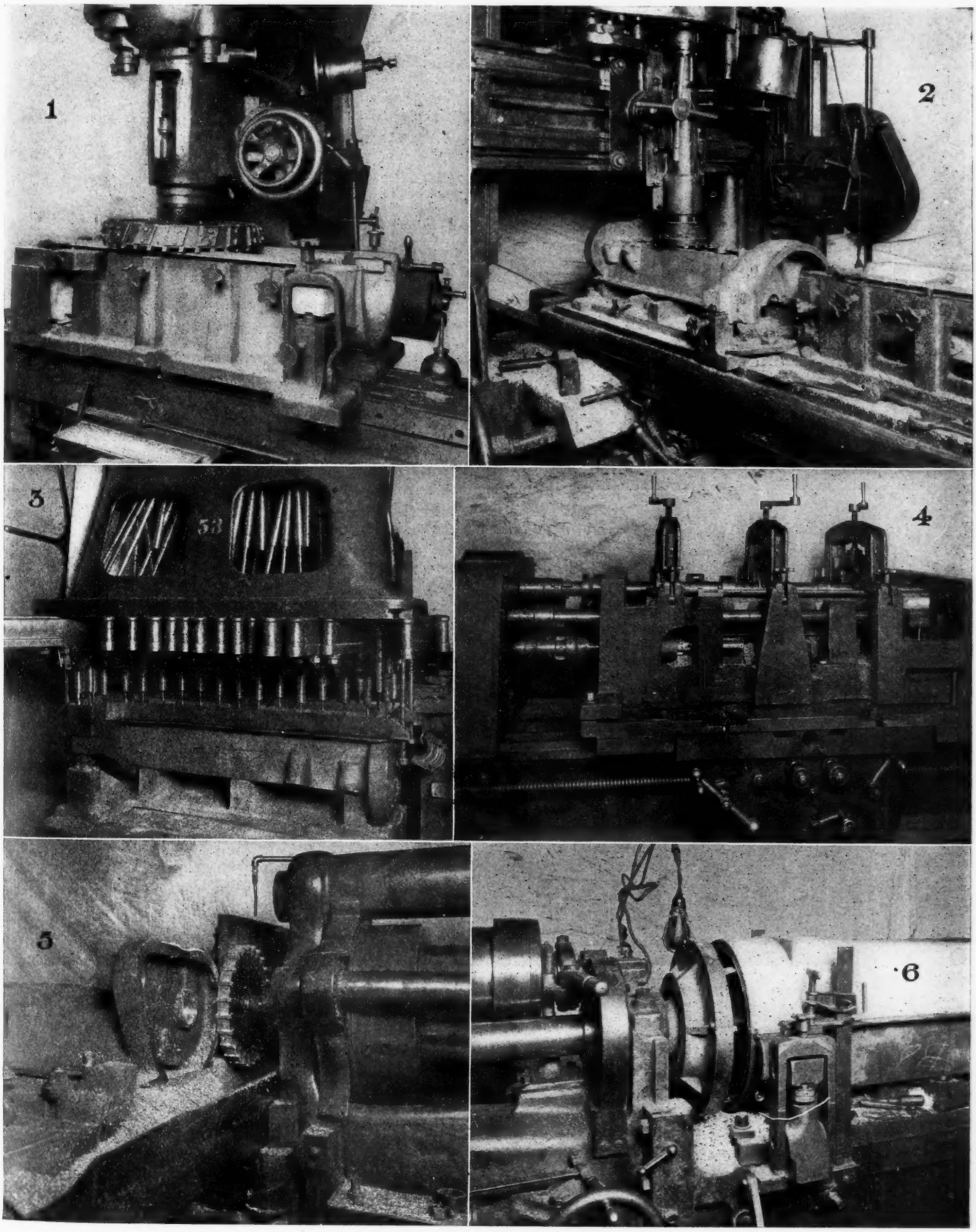
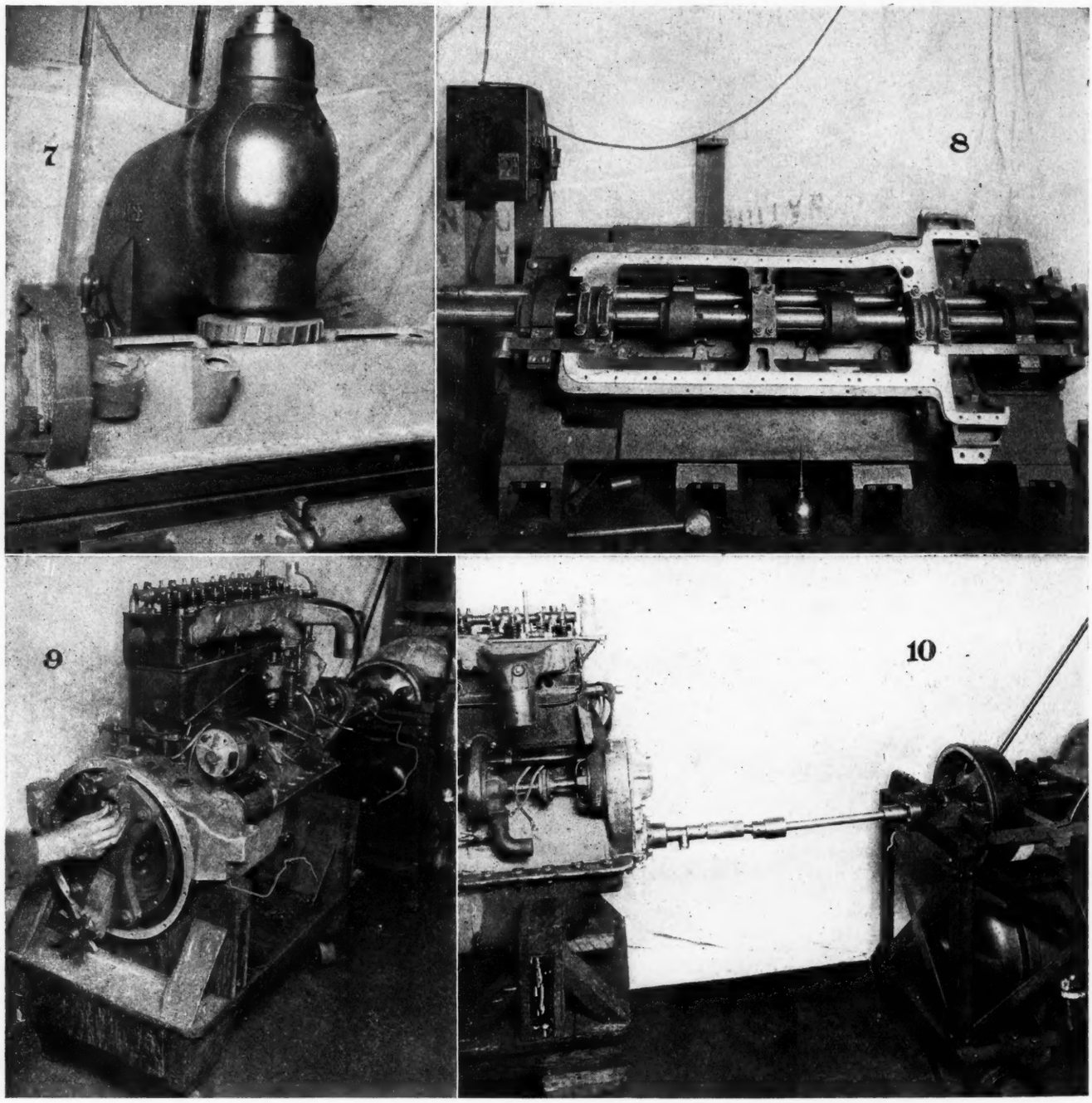


(1) Rough milling bottom of National crankcase on Becker vertical miller. (2) Rough milling top of crankcase and finish milling operation on Beeman & Smith machine. (3) Drilling holes for oil pan cap screws on multiple-spindle drill. (4) Boring, flycutting and reaming bearings on a special remade lathe and with a 2000-lb. jig. (5) Milling timing gear face on a Becker machine. (6) Boring and facing flywheel housing, leaving $\frac{1}{16}$ in. material for aligning



(7) *Final milling of crankcase, taking off .005 in. of material from the cylinder pad.* (8) *Line reaming bearings on fixture with bronze bushing in place.* (9) *Tool bolted to flywheel to face off flywheel housing.* (10) *Same operation as Fig.* 9, *showing method of driving crankshaft through clutch from motor*

the bearing, and this in combination with the flycutting method has been found to give extreme accuracy of alignment and roundness in the location of these bearing surfaces. The jig shown in Fig. 4 is the design of and was made largely by the man who now superintends the operation on this machine, and consequently unusually careful workmanship results. After the flycutting operation, all of the cylinder hold-down bolt holes are drilled and tapped, and the center main bearing bolt holes are counter-bored. These operations are accomplished on a Hammond radial tapper.

In milling the timing gearcase face, an operation which is illustrated in Fig. 5, location is secured from the dowel holes which were drilled and reamed on the Natco, the operation shown in Fig. 3. The timing gear milling operation is accomplished on a Becker miller. The opposite end of the crankcase, or the flywheel housing, is milled after the caps are disassembled and the oil pan assembled to the case. The flywheel housing is bored and faced, 1/16 in. stock being left on the bore and on the face of the flywheel housing to take care of alignment. This 1/16 in. is removed, as will be afterward described, as a final operation before assembly to the clutch and gearset. The tool utilized for turning and boring the flywheel face on this primary operation is a Vinsse, and the location is from the milled face of the center bearing and from the bored and reamed crankshaft bearing holes; that is, the holes which were previously flycut. This gives a primary alignment of flywheel housing in connection with squareness to axis of crankshaft, due to this method of location.

As a final milling operation on the crankcase, 0.005 in. is taken off the cylinder pad face to be sure it is flat. During this operation the case is set on four pieces of paper and lightly clamped to prevent springing. A very accurate cut is taken on this so as to give a very closely machined pad face.

Having made certain that the bearing support surfaces are accurate, due to the flycutting operation, this same care is maintained in finishing the assembled bearing. The bronze bushings are assembled to the crankcase and it is mounted on a line reaming fixture located from the cylinder flange surface, and the main bearings and camshaft bearing bushings line reamed by means of a flycutter and slow feed, advancing at about 1/32 in. per revolution. The combination of the flat surface of the crankcase cylinder pad, the line reaming of the bearing and the ground bottom cylinder flange give positive alignment of bearings and also of cylinder bores.

The final operation on the crankcase is probably the most interesting of all, as it is a very ingenious method of securing alignments of the clutch and transmission with the crankcase, and also with the center line of the crankshaft. In order that the clutch housing lines up absolutely with the flywheel, the cutting tool is bolted to the face of the flywheel and driven through the crankshaft, taking a cut off the flywheel housing. The clutch housing, of course, bolts against this and, as in the manufacture of the other unit, the clutch is made to line up with the center line of the clutch shaft in a similar manner, so that when the two faces of the flywheel and clutch housing come together, they are concentric with the clutch and transmission shaft, as well as the crankshaft.

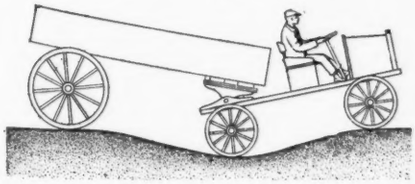
In driving the tool for taking the cut off the clutch housing, the crankshaft at the front end of the engine is connected through a shaft and universal joint with an electric motor. This turns over the shaft in the same way as the starting crank would turn it over, but at a uniform speed suitable for machine purposes. The drive is shown in Fig. 10. The manner in which the tool is bolted to the flywheel is shown in Fig. 9. This latter illustration indicates a hand feed for the cutter, but this is now being improved so as to give an automatic feed, which will eliminate the human factor altogether in making certain the alignments between the flywheel and the housing. As will be seen, there are two tools on this machine, one facing and one boring the clutch housing as the flywheel rotates, because of the drive through the crankshaft.

Semi-Trailer Coupling with Springs and Rocker

THE semi-trailer coupling shown on this page is of the rocker type, which allows the vehicle to conform to depressions and elevations in the roadbed. The necessary movement is made possible by the lateral trunnions indicated. An additional feature is the provision for shock absorption on starting and stopping. Heavy springs on both sides of the trunnions are located in suitable housing and produce a cushioning effect. These coiled springs play an important part in starting and allow the tractor to get under way before the trailer is set in motion. The action may be compared to that of a train of cars in which the loose spring couplings actually allow the separate units to be started one at a time. This model is known as the Martin rocking fifth wheel.

Four sizes of this fifth wheel are made: 18 in., for light runabouts; 24 in., for 1-ton trucks; 30 in., for 2 and 3½-ton trucks and 36 in., for 5-ton trucks. The more expensive portion of the coupling, which contains the springs, is placed on the truck or tractor, while the less expensive part is attached to the semi-trailer. This reduces the cost considerably when several semi-trailers are used with the one truck or tractor. The two parts of the coupling are fastened together by means of a forked lock bar which straddles the king pin.

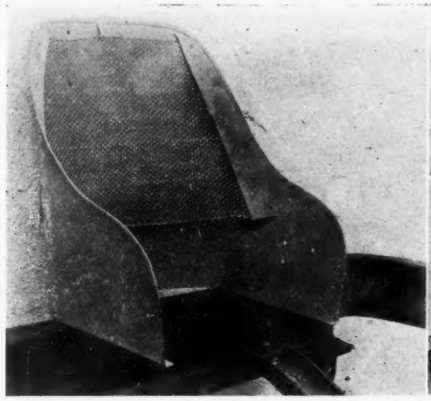
The fifth wheel as installed



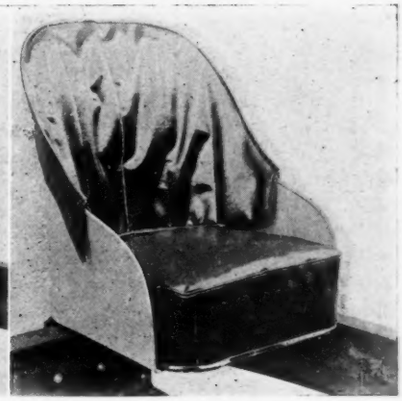
Showing the flexibility of the device

New Form of Truck Seat

THE photographs herewith illustrate a form of driver's seat used on the trucks of the Fageol Motors Co. It will be seen that the frame of the seat is made of sheet steel, which is formed to shape and has the edges bent over. In order to provide a soft back support for the driver, a section of wire netting of the mattress type is secured to the inside, being held in place by means of steel strips secured to the seat with screws. This wire netting is covered with leather, which is arranged loosely so that it can follow the netting when deformed by the pressure of the driver's back against it. We are informed that this back cushion greatly relieves the strain on the driver on long trips.



Fageol truck seat, showing wire netting used to provide comfortable back support



Covering of leather arranged loosely to follow the netting when deformed

Progressive Assembly System Increases Truck Production

Truck assembly has not yet reached the high degree of efficiency which characterizes passenger car production. A Buffalo truck manufacturer, however, has installed a progressive assembly system which embodies many of the best practices, and it has proved very effective.

By Norman G. Shidle

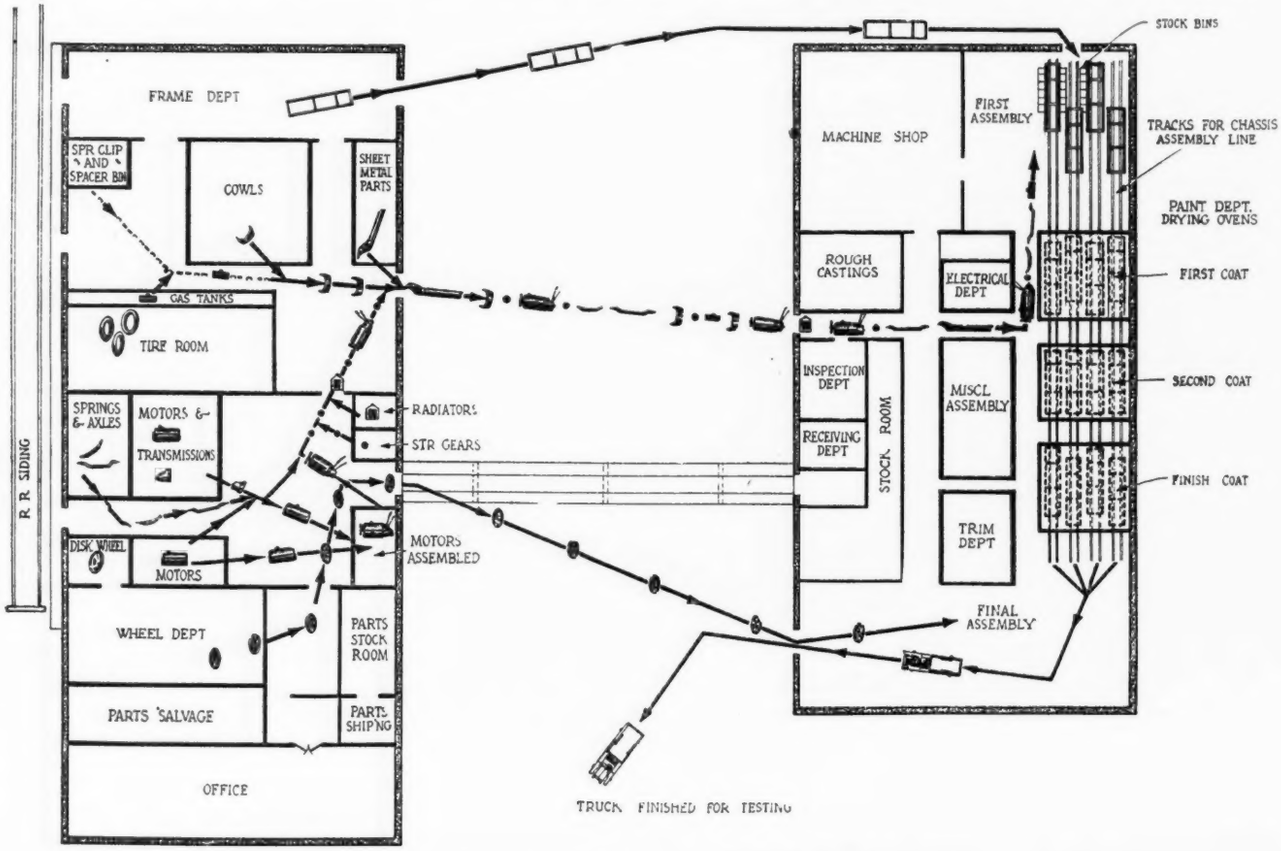
THE silver lining to the cloud of railroad freight congestion is the increased prominence of the truck as a means of transportation. With the motor truck coming thus into greater commercial service, the problems of effective truck production assume an added importance. Thus far, the manufacture and assembly of trucks has not approached very closely the high degree of efficiency which characterizes passenger car production. Yet improved methods are constantly coming into use as the result of experience and investigation. The assembly system developed at the Stewart Motor Corporation presents some interesting phases of progressive truck assembly development.

The output of the plant averages about 30 trucks per day, while the working force comprises some 650 men. The progressive assembly system has been in complete working order only about eight months, and production records show that the January and February production for 1920 exceeds that of the same months in 1919 by 260 per cent. The largest truck manufactured is a three-and-one-half ton, while the other sizes range down to three-quarters of a ton.

The general layout of the factory is shown in the diagram. All materials are shipped in on the railroad siding, which is indicated at the left of the figure; that is when the railroads are moving freight. When they are not, a fleet of 50 motor trucks keeps the factory supplied with materials for full opperation.

Fig. 1 shows the railroad siding upon which materials are received and trucks are shipped out.

The building on the left is used chiefly for storage purposes, Fig. 2 being an interior view of one of the stock



General layout of factory, showing course of production

1—*Railroad siding upon which material is received and trucks are shipped out.* 2—*One of the stock rooms.* 3—*Springs and axles being placed on truck.* 4—*Trucks on assembly line just before receiving first coat of paint.* 5—*Truck just out of first drying process.* 6—*Putting on wheels and headlights; final assembly operation.* 7—*Group of trucks ready for road test.* 8—*Packing for export shipment*

rooms. In the rear, however, the frames are assembled. They are then transported by electric trucks to the end of the right-hand building as indicated by the arrow. Here the actual assembly line begins. All other materials pass through the small open space between the two buildings in like manner and are placed in their proper position along the assembly line. There are four assembly lines, each of which is used for a different type of truck. Thus all trucks of similar weight are assembled on a single track. One of the tracks is usually reserved for body assembly.

The assembly begins at the rear of the right-hand building, indicated as "first assembly" on the chart. Here the frame is mounted upside down on saw horses. While in this position, the rear and front axles and the springs are mounted.

All heavy parts are handled by means of hand-operated overhead cranes. Thus the parts are transported from the storage bins to the assembly line, and thus they are placed in position. Fig. 3 illustrates the first assembly operation as well as the use of the overhead crane system for placing heavy parts.

The frames are next turned right side up and mounted on the assembly tracks. It will be noted in Fig. 3 also that there are storage bins immediately adjacent to the assembly line for parts about to be assembled. These various parts are then assembled as the truck moves on wheels over the narrow gage track. The steering wheel is put on next, followed in turn by the engine, transmission and drive shaft. Next the cowl, radiator and hood are placed in position. As noted before, such heavy parts as the radiator and engine are put in place with the aid of the overhead crane system which runs throughout the building.

When the truck has reached this state of completion, as shown in Fig. 4, it is ready for the first coat of paint. After the first painting operation, the truck still on the track is moved into the first drying oven, where it is baked for some four hours. Fig. 5 shows a truck just out of its first drying process and receiving its second coat of paint. When the second coat has been applied, the truck is pushed on the second drying oven and is again baked. The painting and drying process is then gone through with a third time, in order to insure a firm finish which will withstand the hardest kind of wear. The painting of a Stewart truck is at present done by hand, though experiments in the use of the spraying method are under way.

When the final coat of paint has been dried, the truck is pushed from the third drying oven, and the wheels and headlights are put on, as illustrated in Fig. 6. This operation concludes the final assembly, as the body is not put in place until after the truck returns from its trial run. Fig. 7 is a group of trucks upon which the finishing touches are being put prior to the road test.

Since about 20 per cent of the Stewart product goes to foreign countries, a department especially designed to handle packing for export has been established. Fig. 8 shows the process of packing. The cars to be exported are assembled and taken for a trial run, as are all others. They are then brought to this packing room, torn down, and carefully packed for foreign shipment.

Men are, of course, essential to the successful operation of any assembly system, regardless of mechanical methods and aids which may be installed. Records in the Stewart plant show that the labor turnover among the assembly men is considerably lower than that of the machine shop. The average for the plant varies from 2 per cent to 7 per cent monthly. Most of the men working on the assembly line have been with the organization for a number of years, some of them ever since it started in 1912. This fact undoubtedly has a definite bearing on the fact that this progressive truck assembly system has worked out so well.

These workers, having been with the company a long time, have become interested in the organization and the product. This is evidenced by a number of small improvements in construction and production which have resulted from suggestions made by workers. On top of the tool box, for instance, a rectangular board is screwed, enabling the driver to use the tool box as a step in ascending to his seat. While the device is not particularly important in itself, it is interesting as indicating the interest in the finished product which motivates many of the men working on this assembly line.

The combination of a well planned progressive assembly system and an interested force of workmen is the chief factor in enabling the plant to keep production at a normal level even during times of considerable industrial unrest.

Magneto and Battery Ignition Compared

CONSIDERABLE interest has often been expressed by engineers as to the relative power output of engines equipped with magneto and battery ignition respectively. This question came up in the work of the Bureau of Aircraft Production, and in connection with it a test was made at McCook Field, Dayton, Ohio, for the purpose of determining the performance of a 180-hp. Hispano-Suiza engine when equipped with Dixie magneto and when equipped with special Delco battery ignition. The difference in performance was so slight that only one power curve was plotted. (Engine report No. 155, page 6.) This is in line with previous comparative tests made at McCook Field with both battery and magneto ignition; it was found that battery ignition and magneto ignition would give practically the same power on the same engine. The gasoline consumption also was found to be practically the same.

As regards weight, two magnetos, each weighing 14½ lb., one starting magneto of 6 lb. and one switch of 1 lb., make a total of 36 lb., while for the Delco battery ignition, two Delco units, including distributors, breakers, coils, etc., weigh together 30 lb., ignition battery, 10 lb., and switch and regulator, 2 lb., giving a total for battery ignition of 42 lb., or 6 lb. in favor of the magneto.

A PAPER read before the English Institute of Metals gives some interesting data concerning the development of a practical high tensile strength manganese bronze. Its composition is as follows:

Copper	60.0
Zinc	34.0
Nickel	3.0
Iron	2.0
Lead	0.25
Manganese	0.5
Phosphor-tin	0.25

This alloy, when properly melted and poured, can be relied upon to give sound castings, cast in sand molds, having a breaking strength of 20 tons per sq. in., elastic limit of 10 tons per sq. in., and elongation 15 per cent in a length of 2 in.

New Model of Marine Engine Has Piston Type Valves

One of the features of the new Osborn marine engine models is that the valve acts as an auxiliary piston and assists in turning the crankshaft. Prior to fuel admission, the main piston descends half way, thus producing a partial vacuum and causing a steady draught in the carbureter.

INSTEAD of depending upon the customary poppet valves, the new models of Osborn marine engines have piston type reciprocating valves to regulate the usual cycle. During the first half of the suction stroke, a partial vacuum is created in the main cylinder, whereupon the inlet port opens and admits the fuel rapidly, even when the engine is running at low speed. Because of the rapid movement of air past the spray nozzle of the carbureter, a full supply of fuel is drawn out and a lean mixture avoided when starting.

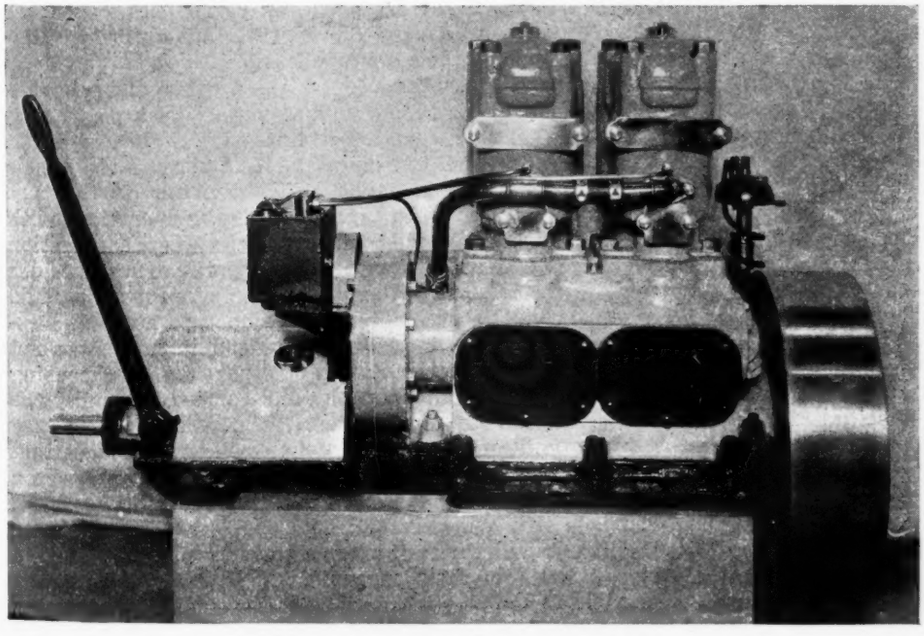
As the main and valve cylinders communicate at the top, the explosive effect of the fuel charge is transmitted to both departments. During the power stroke, the valve is moving in the direction in which the exploding charge tends to force it, and hence acts as an auxiliary piston, assisting in driving the crankshaft instead of absorbing power from it. During exhaust, intake and compression, the valve is moved solely by a connecting-rod attached to a small crank turned by a chain from the crankshaft at half the speed of the latter.

Fuel is taken into the valve cylinder at the side and passes up over a web and through a series of fins extending from the top of the valve at its hottest part. Heat is thus conducted away from the explosion chamber by the fins and is utilized to preheat the fuel charge just prior to admission to the main cylinder. When the main piston is at the lower end of its stroke, the inlet port is wide open, admitting a full charge of preheated gas. When compression begins, the main piston seals the inlet port and thus for the time being functions as a valve.

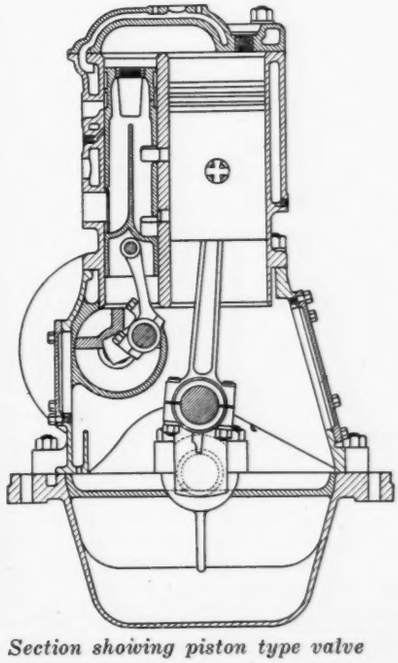
Advantages claimed for the engine include economy of operation, simplicity resulting from the absence of cams, cam followers, rollers and valve springs. The mechanism is said to be practically noiseless in operation, a feature that should appeal very strongly to the motorboat owner or operator.

The engine is built with 1, 2, 4 and 6 cylinders, suitable for cruising, commercial service, auxiliary or heavy duty. Cylinders are cast separately and are offset 1 in. from the center. Oil feed to the main bearings and connecting-rods is by the splash system, and a separate force feed is used for the other parts. A constant level is maintained in the pockets into which the oil spoons dip as the crankshaft revolves.

The rated capacity of the one-cylinder engine is 5-7 hp.; of the two-cylinder, 12-18 hp.; the four-cylinder, 25-40 hp.; the six-cylinder, 40-60 hp. The bore is 5 in. and the stroke 7 in. for all sizes. The engine speed is 400-600 r.p.m. in the one-cylinder type; 500-700 in the two-cylinder, and 500-900 r.p.m. in both the four and the six-cylinder engines. Ignition is by the Atwater-Kent system and carburetion by a Schebler.



New model of Osborn marine engine



Section showing piston type valve

Industrial Housing in England Subsidized by Government

Great Britain faced a housing shortage after the war with which private enterprise was utterly unable to cope. The responsibility has been met by public building and renting at a loss, which amounts to bearing the increase by taxation. This article furnishes much for American discussion.

By Clarence H. Northcott

THE housing problem in Great Britain is unusually acute. It is creating a large amount of unrest. Men are at their wits' end to get houses. They cannot leave the places where they have been domiciled in order to accept better positions, for they will invariably stand little chance of getting homes. If they have returned from the war, they have probably been compelled to board in one or two rooms with relatives or strangers. If they are earning good wages, a very heavy proportion of them will go in paying for these rooms. If they want to marry, they will be in as great a difficulty. Whatever they do to better themselves is heavily discounted by the housing situation.

The extent of the shortage is astounding. Before the war even there existed a deficiency of houses that was quite obvious. During the five years of the war house building ceased completely, while the population continued to increase and old houses went out of use. At the end of the war there was an urgent need of at least 500,000 houses. But prices of building material had risen greatly; building labor was dearer and scarcer by at least 200,000 men, and the whole situation uncertain. Houses were sure to be much costlier to build, and an economic rent would be much higher than had ever been known in British history. It was thought that the British workers would never be able to pay such a rent and a loud demand arose for any sort of scheme that would build cheap houses for them.

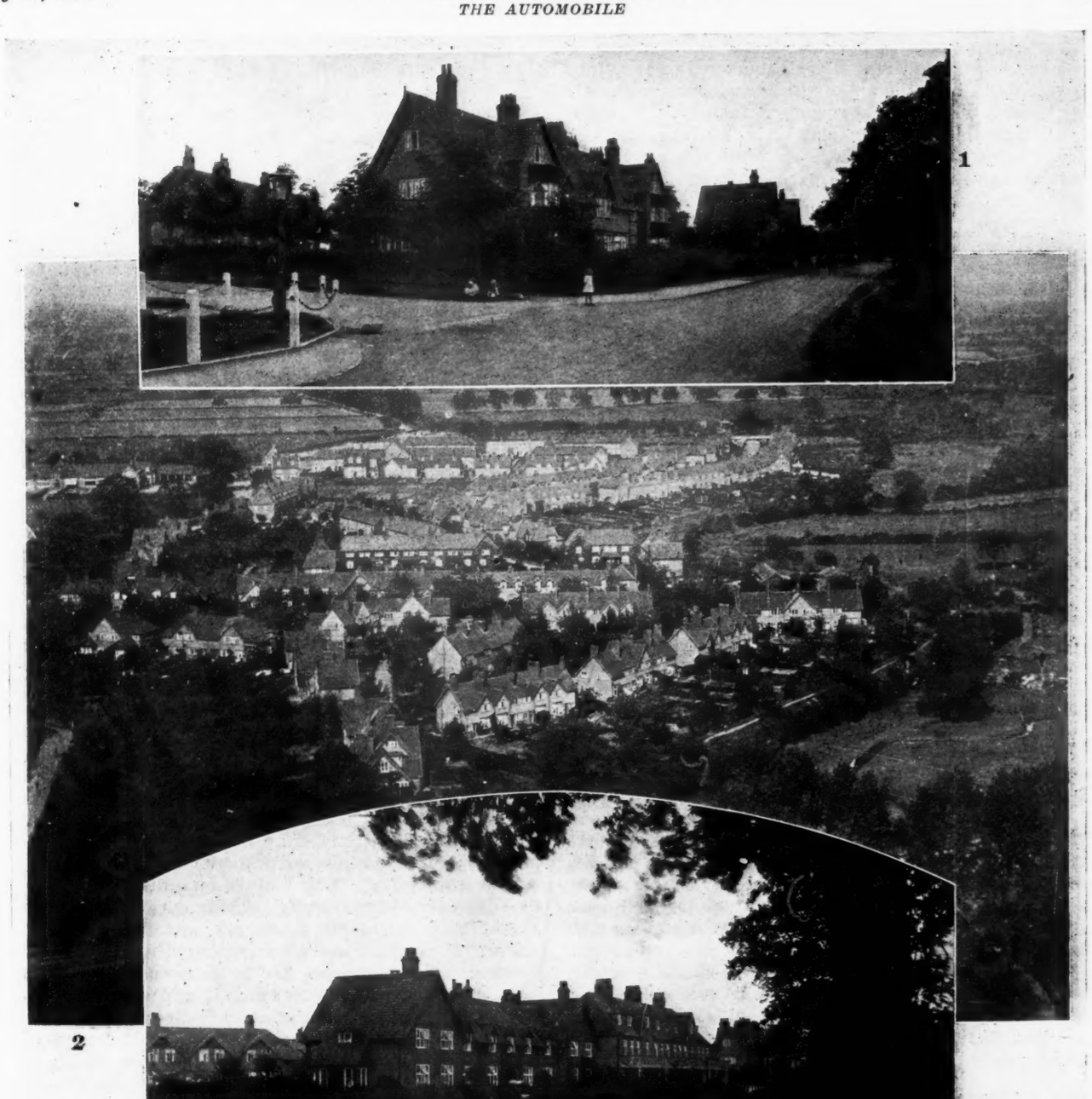
It should be said that the British worker is niggardly of expenditure on rent. When his wages ranged from 20 to 30 shillings, he wanted a house which would cost from 3 to 5 shillings a week. Now that his wages are from 60 to 80 shillings a week, he is almost blasphemous concerning a suggestion that rents for such cottages will be from 10 to 13 shillings a week. In order that he shall not be called upon to pay more than a conventionally determined figure (and it must be a low one, even under present conditions), he will submit to reductions in the size and comfort of his cottage. The Minister for Housing, for instance, has been advocating a reduction in the heights of ceilings to 8 ft. to meet the desire for a cheaper house. This sort of niggardly thrift is an inheritance from the low wage era of the past. A nation reared on low wages tends to have a low standard in regard to two such vital matters as education and housing.

Long before the war ended it had become clear that the shortage of houses could not be met by the private builder without assistance. Prior to the war, about 95 per cent of the houses inhabited by workers had been built speculatively for as rapid sale as possible. In view of the increasing costs of building, the scarcity of labor and materials, and the uncertainty of employment and wages, no one anticipated that the speculative builder would take the risks of building for such a market. As events have turned out, the results have been as anticipated, but not only for those reasons. There is so much building of industrial plants and large structures in towns, and so much pressing and remunerative repair work to be done that private builders would not have cared for speculative schemes in any event. But, further, such builders have been largely wiped off the slate. England has gone in for building by State subsidy, but little of this goes to private builders except in payment for a contract, or as a subsidy on such few houses as they might build. Their reluctance to undertake the risks of building was so great that the proposed subsidy has been greatly increased until it now stands at from £230 to £250 per house, nearly one-quarter of the probable cost.

Under the scheme which has been set up by various Housing Acts, the chief building agencies are to be what in Great Britain are known as local authorities, that is, urban and rural councils. These bodies are entrusted with the selection of sites and the building and ownership of houses. Money is to be raised by them through special issues of housing bonds, which will bear a good rate of interest and will be repayable at par. The houses are to be let at rents on a scale approved by the central authorities. The whole annual loss incurred by the local authorities in consequence of these rents being below true economic rents is to be met in part by a penny rate on the housing area, and the rest by the State exchequer.

Far more important, however, to American readers is the method by which public utility societies, as they are called, may be set up to carry on building operations with a State subsidy. A public utility society is a corporation registered under the same act as co-operative societies are registered. It must have not less than seven members and a secretary. Its accounts must be open to audit and examination and the interest or dividend it pays must not exceed the statutory limitation of 6 per cent. Its housing proposals must be approved by and carried out under the regulations of the Ministry of Health.

The significance of these societies lies in the fact that bodies of workers may unite for the carrying out of a small building scheme for their own homes. The financial help they will receive would enable a small group of intelligent and thrifty workers to house themselves in a style exactly to their convenience. Further, it makes it possible for employing firms to carry out a large housing scheme for the benefit of their employees, restricting the profit on such scheme to 6 per cent, and using the Gov-



1—A village corner at New Earswick, York. 2—An aerial view of the village of New Earswick, where the Rowntree building activities are centered. 3—Workers' homes at New Earswick, York. This and other pictures illustrating this article were furnished by Rowntree, Ltd.

ernment subsidy to reduce the rental cost of the house so as to be able to offer their houses to their workers at a reasonable rent.

The financial assistance which is forthcoming consists of loans and subsidies. Such societies may borrow from the state at the lowest rate for a period of fifty years a sum equal to three-quarters of the cost of the land and buildings. The subsidies consist of annual grants. Until 1927 these are to amount to 50 per cent of the loan charges on the total cost of the plan. After 1927, until the end of the period of fifty years, the subsidy is to be 30 per cent of those charges. It is significant of British character that a plan of this sort should provide for fifty years ahead, and equally typical of British conservatism that houses should be built to last fifty to eighty years.

The suggestion that employers should take advantage of these provisions to house their employees has been acted upon in many instances. Owing to the recency of the schemes and the difficulties over labor and materials, few of these housing schemes have gotten very far. It is enough to add that the Federation of British Industries, which corresponds in Great Britain to the National Industrial Conference Board of America, has given its approval to this method of meeting the needs of industrial

housing. It has pointed out how these public utility societies can be co-operative. They cannot really be run by corporations without the aid of their employees or tenants. These plans, therefore, introduce a feeling of common interest between employers and their workers and thus enable a better type of house to be built at a lower cost.

Various types of houses are being constructed. The majority are built of brick and are of the self-contained two-story type. Their accommodation ordinarily consists of living room, scullery (kitchen or kitchenette), pantry, bath, coal store and three bedrooms. A certain proportion of these houses are provided with a parlor, although some of them may have only two bedrooms. The bedrooms always, and very often the bath, are upstairs. Hot water is provided for the bathroom and the kitchen, being heated either at the kitchen range or from the fire in the living room. Since the kitchen range, fed by soft coal, is going out of fashion, it is becoming customary to heat the water from the living room fire. Fireplaces are always provided in the parlor and in two at least of the bedrooms. No form of central heating is in vogue in the cottages of Great Britain. Careful attention is given to the lighting of the rooms and to their position, so that the largest possible quantity of sunshine may enter.

To get cottages offering the same accommodation built more quickly, some companies have tried experiments in different styles of houses or in different materials. Thus the firm of Dorman, Long & Co., steel and iron manufacturers, who are putting up new steel works and rolling mills in the Middlesborough district, found themselves compelled to take such action. They set about building an industrial village on garden city lines, providing for about 3000 houses. Some 300 houses of the ordinary type, built in brick and timber, were erected. This did not even begin to meet the demand. As building materials were scarce and expensive and labor was short, the company set out, therefore, to find a form of house which would cost less than brick and could be more quickly erected. The result was a steel-frame concrete house which gives every protection against weather and time and yet permits of picturesque treatment. A similar type of cottage is reported from Dorset, where an equal success has been achieved. It should be recognized, however, that the concrete style of house is not favored in Great Britain, while the frame house could not even get consideration. The damp climate and leaden skies would test any timber.

Many Companies Building Houses

Other large firms have been compelled to set up housing schemes in order to find quarters for their workpeople. The Austin Motor Co. has an excellent scheme on a large scale. The Leyland Motor Co. has had to enter upon a plan on similar lines in order to find living accommodation for their rapidly increasing staff of workers. Their houses will be what are known in England as semi-detached villas, that is, two single family houses built under the same roof but side by side. Ruston & Hornsby, the engineering firm which has Lincoln as its headquarters, has started to build 3000 houses. In this case, a unique lesson in co-operation has been furnished. The firm has subscribed £10,000 to the building society in loan stock. A further £100,000 has been subscribed by two directors of the firm. The local co-operative society has taken £10,000 loan stock and will provide the shops for the village. To crown all, the management committee of twelve includes a number of the workers who are tenants of the homes. This firm is going to supply central heating and a supply of hot water to each house by utilizing waste heat and steam from their works, and will generate electricity for each house for lighting and cooking.

Another illustration of an endeavor to build cheaply and quickly is found in the work of the Joseph Rowntree Village Trust, at New Earswick, near York. This trust was formed some sixteen years ago by a gift from Joseph Rowntree, head of the cocoa firm at York. The money was given to be used for the building of workers' homes that would afford all needed conveniences at a rental which a worker could pay. A start was made near the firm's own works, where some 900 houses are projected. When this scheme is finished, however, the trust, which is a continuing corporation, will take up its activities in some other industrial center. Prior to the present shortage, it was building houses that were let at from 4s. 9d. to 8s. per week, and yielded a net return on investment of 3 per cent. Latterly, the cost of houses of the same size has more than doubled, so that rents, to yield a net return as stipulated in the trust deed, of 3 per cent, must run from 10s. to 15s. per week. Every effort has been made to reduce the price but with little success.

Single Story Bungalows

To meet the acute shortage, however, the trust's architect suggested the building of single-story bungalows. Twelve of these have been put up in three months, whereas four two-story cottages would be all that could be erected in the same time. These bungalows contain living room, scullery, three bedrooms and the other accommodations looked for in a British working home. They have gas and electricity and a number of the more recent domestic conveniences. Their erection has been followed with a good deal of interest throughout the country, as they represented an effort to build homes for workers at the cheapest price and in the speediest time. Their cost is far below that of any tenders for such houses yet made public, while an average of one bungalow a week has been finished.

Their erection afforded an opportunity for an instance of co-operation with labor that any public utility society can as easily effect. Last fall the operatives on the trust's buildings were doing badly. Their output was no better than that of operatives elsewhere, and that was, and remains, a scandal and reproach. Further, inclement weather had led to much broken time and reduced wages. The operatives, smarting under their wage grievances, approached the trust and asked for better conditions, especially such as would secure them against unemployment and broken time. The trust took the opportunity to review the whole situation. It was obvious that discontented men, whose earnings might be reduced by a hard winter to an amount insufficient for their families, would not help the trust to build houses for the workers as speedily as possible. They must be guaranteed unbroken work. They must, if called upon to work hard, be assured that they were not thereby working themselves out of a job. The trust needed a lot of concrete for the development of the village. It, accordingly, turned two army huts into a minor concrete factory wherein the men could work when rain or frost prevented outdoor work on cottages. Further, it offered the men the opportunity which temporary operatives at the cocoa works of Rowntree & Co., Ltd., enjoyed, of putting a certain sum per week into a fund which the firm doubled and allowed a man to draw in full should scarcity of work compel dismissal of labor. The latter contingency was minimized by the assurance of the trust that they had twelve years' development work before them at the village. If a man left of his own accord, he drew his own contributions, at compound interest.

With these two assurances to offer its employees, the trust put all its cards on the table. It told the operatives that its only aim was to build cheap houses for their fellow

workers. Ninety-five per cent of its tenants were manual workers. It did not exist to make profits. Its net returns were 3 per cent and that money was, by virtue of its trust deed, put back into the capital fund and used for the erection of more houses. If any slackness existed on the part of the workers, or any unnecessary expenditures were entailed, the sufferers would be their fellow workers, who would have to pay higher rents. The chairman of the trust went on to tell the operatives that their output was far below that of 1914, and that the delay in the erection of houses was a matter they could do much to remedy by greater effort and greater keenness. He announced the readiness of the trustees to make the above concessions, but stated that they looked for a return in speed of output. He outlined their housing plans and told of the projected bungalows. He suggested that a test of the readiness of the employees to put their backs into their work would be the erection of twelve of these bungalows within three months.

The men rose loyally to the occasion. They realized the power of the appeal to them for the benefit of their fellows. They welcomed unreservedly the provisions concerning unemployment. They accepted the challenge to build twelve bungalows in three months. Discontent gave place to keenness and co-operation. The scheme was formally announced at a supper and smoke concert and it was agreed that another supper and concert should be held if the houses were finished in the stipulated time. The second concert has been held, and proved a matter of congratulation and satisfaction.

To sum up, the housing situation in Great Britain is one which has called for new measures and for a large amount of State help. Houses cannot be built at greatly increased costs of material and labor and yet be let at an economic rent. The people have decided to meet this new form of war responsibility by bearing through public taxation a portion of the added cost. This is the State subsidy. The magnitude of the task is beyond the capacity of the private builder, whose contributions in the past have been the squalid streets of so many of Great Britain's industrial centers. The whole people are determined to have houses fit for heroes to live in. There is an awakened public opinion on the matter. The houses are long in coming, but so many people are interested in the matter that delay, explicable in itself, will probably produce a cleaner, brighter industrial England.

On the Basis of the Worker

SEVERAL of the important conclusions concerning industrial relations reached by Whiting Williams, the industrial corporation director who spent seven months knocking about from plant to plant either looking for a job or working as a semi-skilled or unskilled laborer, were touched upon in an article by Mr. Tipper a few weeks ago. Other significant points in the experience of Mr. Williams were brought to light by an interview recently published in the New York *World*.

When asked why he undertook this rather unique experiment, Mr. Williams answered: "My experience gradually led me to the conclusion that the problem of industrial relations was at bottom psychological. The important thing in the industry is what the workers feel toward the owners and managers, and vice versa. Feelings are more important than ideas and they also are more powerful in forcing action. As an officer of my company, I could go about and talk to the men about their ideas but I could not so easily get at their feelings. I decided to break through this barrier by going out among the men as one of them and sharing their life."

This statement indicates the two fundamental factors in solving the problem of industrial relations. The executive must:

1. Sense the problem and analyze it thoroughly.
2. Realize that it can not be solved without a thorough and comprehensive understanding of the feelings and environment of the men with whom he is dealing.

From these two things, Mr. Williams went a step further and carried out his study in a rather exceptional way, through becoming a workman himself for a considerable period of the time. In connection with the feelings of a man looking for work, Mr. Williams made a significant statement:

"Suppose you are looking for a job. You come up to the gate. There is a policeman watching. When the man at the gate is unceremonious or gruff, the result is that the worker goes away in a sore state of mind. A few such experiences during a day or week and he grows discontented. When he finally gets a job, he brings to it the accumulated emotions of the days or weeks during which he has looked for the job. It matters not that the new employer is not personally responsible for the treatment of the workers in other plants. *The workers usually generalize their individual experiences.*"

It is undoubtedly true that most persons, whether workmen or executives, are prone to draw general conclusions as a result of their own personal, though limited, experience. In recognizing this fact, the investigator indicates a real desire to learn industrial facts as they are and to base the solution of the problem of industrial relations upon those facts. Executives too often are content to work out a theory of industrial relations in their own minds and to administer that theory without regard to the actual facts. This is often true even when the entire theory can be summed up in the two significant words: "big stick."

The chief cause of industrial unrest, according to Mr. Williams, is fear of joblessness.

"It is the job, the desire to hold it, the fear to lose it and the agony of hunting, etc., that shapes the most fundamental feelings and ideas of the worker." Two other conditions which affect industrial unrest are the relation of fatigue and temperance in the worker's life and the total ignorance of the unskilled worker of his employer's purposes, plans and character.

While the actual conclusion which Mr. Williams draws from the results of his practical investigation are interesting and valuable, it is the attitude of mind revealed by the facts leading up to the survey and the carrying out of the investigation itself which are significant. Here is an executive who believes that industrial relations must be looked at as a distinct problem. They must be studied. They must be investigated thoroughly and handled competently if we are to have a cessation of present industrial unrest. In this type of executive mind lies the only hope of successfully co-ordinating our industrial organization through an intelligent handling of the various personnel relationships.

Frederick W. Taylor advanced the theory in industry that each job should be approached from a scientific viewpoint: that all of its factors should be analyzed. Experience proved him right as regards machine-shop practice; the same thing is true in regard to human relations.

Co-operative Trading in the Automotive Export Field

This article is a consideration of the possibilities in the formation of foreign trade companies under the Webb-Pomerene act for the automotive industries. Exporters are making every effort to better their foreign trading policies and combinations of producers may solve the problem.

By George E. Quisenberry

A PARTICULARLY promising tendency in the foreign selling of American-made automotive equipment is the evident attempt, particularly within the past few weeks, of numerous manufacturers to better their export connections and to take up the exploitation of such sales abroad upon a firmer basis of merchandising effort. This is shown by the fact that several companies, among them some of the largest, have expanded their foreign departments and affected internal readjustments of methods that bespeak greater future sales.

Several factors of trade are involved in this betterment of method which seems gradually to be spreading through the industry. The first, and perhaps the more important, cause seems to be a growing realization that distribution of the automobile and its attendant products throughout the world is tending to return to the competitive basis of former days. The war-time demand, with its sales limited only by factory capacity and the rush of buyers to this country, seems about to turn into a buyer's market. The rising tide of European production, more immediately in the matter of parts and equipment than of cars, is taken as an indication that the American maker will face shortly a foreign market which will not be his for the mere asking, but which will necessitate the utilization of all his manufacturing and merchandising abilities, if it is to be held in proportions approaching those of the present.

The Foreign Trade Situation

Consciousness of this situation has grown despite the continued sharp demand for American-made cars. Reports of the country's exports in May, just made public, reveal that almost 15,000 cars were shipped out of this country to the foreign markets, a figure quite well above the record month of March, 1920. The first six months of this year will be shown to have been by far the largest in the history of the industry and shipments are continuing in a volume that appears to be limited only by the transportation congestion between the factories and tide-water. An immediate let-up, or even a decline, for at least several months to come, is scouted by automotive exporters in general and there is little fear that the American manufacturer will be forced to give up the outlets he has dominated so completely since the beginning of the World War.

Nevertheless, many manufacturers are "putting their houses in order" and others have possible developments under consideration for future action. European output will rise; the huge war-time demands will slacken, and the consequence will be that the makers will be forced to sell their products on a strictly merchandising basis.

Foreign trading requires much preparation and great lengths of time are involved. The maker who would cultivate and hold a market cannot make up his mind to do so one day and have it corraled the next. He must work far in advance, preparing his campaigns carefully, and, likewise with care, he must go about the carrying out of his plans with a vision of their development. It is this, among other factors, that make foreign trading on any basis of permanency a difficult task and one that should not be undertaken without thought and preparation.

The Future of Export Activities

These considerations seem forcing their attention upon the automotive exporter, as he looks forward into the future of his business abroad. They have caused him to consider sales methods and campaigns of publicity and advertising throughout the world. He has gotten, in some instances, thoughts of direct selling, of publishing catalogs and booklets in the languages of the countries in which his goods will sell and of allotting a certain definite percentage of his production to the foreign markets.

Export salesmanship, however, is a costly and difficult process. Many concerns can well afford it and have a volume of business warranting a necessarily costly foreign department. The latter statement refers particularly to some of the large car, tire, tractor, and equipment factories, but others, having a smaller output, have not been able to meet the high expenses of such organizations. Perhaps, sales volume to certain countries or to certain groups of countries would not afford the overhead to obtain the business and, unfortunately, such trade has had to be passed by or the firm has been forced to confine its foreign business only to those orders passed on to it by export houses.

The Webb-Pomerene act was passed by Congress and became a law for the purpose of meeting situations similar to the above. It was believed that a number of competing concerns, grouping themselves together as a sales association, might provide a volume of production and a total of sales that would warrant the maintenance of an adequate foreign organization. The overhead on each factory would be reduced and sales could be made on the lowest basis of cost.

Nearly fifty associations or Webb corporations, as they are called, have been formed under this act. None belong to the automotive industry. Mostly, the products thus sold are in the raw state, such as copper, iron, grain, or

are such as steel, lumber, etc., in which matters of design, quality or material do not form a basis of competition between the different producers. However, several of the corporations distribute manufactured articles, such as mill machinery, office furniture, hardware, etc., highly competitive and frequently covered by patents. This latter class, of course, is analagous to automotive equipment and is surrounded by similar conditions of merchandising rivalry. Were the Webb corporations confined simply to the sales of the former classes of products, they would have no place in the automotive industry. But, as the plan is flexible and as it is being worked out by numerous groups already functioning actively, it should be studied by this industry as offering a possibility for the solution of its export problems.

An Association of Manufacturers

A Webb corporation is an association of manufacturers who utilize a common sales organization and whose products are sold on a common basis. That, for the automotive makers, is its greatest drawback and, when so much has been said, the worst is over. But there are many ways to modify the fact, the conception of which loses much of its harshness in working out the details of the corporation. How that is done, of course, depends upon the makers themselves who, by joining together, make up the selling company and who, through stock voting, directorships, etc., control the details of its operations.

A plan of formation, originated in connection with a machinery association and eliminating many of these features of interior rivalry, was recently worked out by Joseph N. Goodwin, of the New York legal firm of Gilbert H. Montague. Some of its details, summarized herewith, were revealed by Mr. Goodwin as forming a possible background for a Webb corporation in connection with the automotive industry.

The sales company is formed by any group of manufacturers making similar or allied lines. Each manufacturer holds either one or a proportionate number of shares of the common stock, in which is vested voting power. This stock is of a nominal value and draws no dividends, as the sales organization makes no profits. Preferred stock, non-voting and drawing the customary dividends of such stock, is issued then to finance the company, which, naturally, has heavy charges to meet in matters of credit, products, etc. The preferred stock is sold at large, or to members, solely as an investment and ownership has no claims upon the company other than those of its dividends, etc. The mutuality of holding the common stock has no counterpart in connection with the preferred, its issuance being simply for financial reasons.

Export Allotments

Each member allots a certain percentage of his production to the Webb company, which, in turn, becomes responsible for its sale outside of the continental limits of the United States. The manufacturer has given to the company his selling rights in all foreign territory and neither, except by common arrangement, may transgress upon the territory of the other. The manufacturer receives payment for his goods when they are turned over to the exporting company and it then provides the necessary and customary credits for its foreign purchasers, usually either of 60 or 90 days.

These provisions put each member manufacturer upon a cash basis in regard to his export business—a practice which has been customary in the automotive industry but which may necessarily be changed under more competitive conditions—and provide him a predetermined outlet for a certain percentage of his products. What that percentage may be, is determined within the company. Under Mr. Goodwin's plan, periodical meetings, probably once each three months, are held at which this allotment is worked out, because, as it was said, foreign selling involves planning and arrangements must be made well in advance.

The corporation is non-profit making. It finances its sales as seems best. It arranges stocks and foreign representatives according to its business judgment and functions similar to any other exporting house. It charges a commission on sales, Mr. Goodwin suggesting 20 per cent, but this is rebated to the members each three months according to the plan under which the company operates. Legal and business safeguards are thrown around the operations and profit-sharing features in such a way that each member is thoroughly safeguarded.

The Webb plan of foreign selling is individual to the United States and has aroused a great deal of interest, and some criticism, in the other manufacturing countries of the world. Several of these countries appear on the verge of planning similar acts and, indeed, there are numerous combinations of companies for foreign trading elsewhere in the world. The American plan, however, has one advantage in that it provides for a supervised and controlled association of producers who divide, according to the volume of their production, the risks and the profits of the business. The selling companies are organized under the Federal Trade Commission and that body has supervision over its foreign activities, principally with the view of eliminating any unfair or unbusiness-like methods that might creep into an uncontrolled corporation. This provision was made in an effort to do away with any "scandals of foreign trading," of which there has been some unfortunate manifestations to the harm and detriment of all those great American concerns that are doing business all over the world according to the finest ethics of merchandising.

For the Automotive Industry

The value of the Webb associations within the automotive industries is, of course open to question and to proof. It has not yet been tried out and only here and there has it been considered as being of promise in the selling either of cars, trucks, tractors or equipment. The larger companies have not considered it necessary for their business and have gone ahead with their own organizations, absorbing the overhead by the volume of their business. But there are numerous other firms for which any number of combinations are possible. These may take the form of companies handling only cars, perhaps only wheels, perhaps only engines, or they may embrace a much larger range, as an organization absorbing all of these different lines. It has been suggested that these companies be formed to trade merely in restricted territories, into which the total of automotive shipments would not be sufficient volume to attract any one company.

Whatever may be thought concerning the Webb plan for the automotive industries, there is a widespread belief that foreign selling cannot be conducted in the future along "any hit or miss" lines, as much of it has in the past. Manufacturers have been turning their attentions upon the plan of direct selling and it may be that the Webb act will afford them aid in the building up of sales organizations which will be devoted solely and earnestly to the sale of their own products.

A PAMPHLET being distributed by the National Tube Co., under the title, "Anti-Corrosion Engineering," discusses a practical method for preventing the destruction of steam and hot water pipes.

The New Position in Society of the American Workman

The theory that the human element is the most important in production is illustrated by facts and figures from his own plant by A. F. Knobloch in a paper read before the Society of Automotive Engineers. He explains a practical method of keeping contented workers that has succeeded.

By Harry Tipper

THE following paper, which was presented at the Production Session of the S. A. E. at Ottawa Beach by A. F. Knobloch, of the Cleveland Tractor Co., is sufficiently interesting to merit its reproduction here in full. Every practical application which shows the economic efficiency of a study of the human side is of importance at the time when the experimental development must be pressed with considerable vigor.

Like all other cases where the human side has been studied with patience and understanding, the results which have been obtained in this case bear out our theoretical knowledge of the causes of unrest and the solution which must be offered. It will be noted that Mr. Knobloch refers with emphasis to the human element as the governing factor in production and the workers' attitude of mind as the governing factor in the character and the amount of his individual work. We have continually stressed these points in AUTOMOTIVE INDUSTRIES, because of their importance, and we have maintained that the result of proper attention to these matters would be greatly increased production. This paper indicates what can be done with simple machinery and method where the spirit of fair play is emphasized in all the work, so that the worker has confidence in the squareness of the employer and belief in his protection on the job.

Mr. Knobloch brought out, in the discussion upon this matter, one very important item which is not covered in his paper. He said that in the days when he was a workman and carried his dinner-pail,he had suffered from the cutting of piece work rates when he made too much money, and it would take a generation of careful square dealing to eliminate the suspicion which had been engendered by such action. It will take more than a generation to remove the suspicion of the workers which has been engendered by past injustices and voiced by the political propagandists against capital in the abstract.

Mr. Knobloch has proved that it is possible to remove this suspicion in the individual establishment sufficiently to form a basis for better organization in a very much shorter time. From 65 per cent efficiency to 145 per cent efficiency in a year and a half is an economical efficiency well worth while. It is a by-product of the emphasized square deal and the removal of deep-seated suspicion among the workers.

Not the least important item in Mr. Knobloch's paper is the statement regarding the stability of the time study and the careful method by which the time study is secured and the safeguards which are thrown around any changes which may be necessary due to new equipment. These are practical evidences to the worker that the company is endeavoring to be square in its relations with its men.

Mr. Knobloch's paper follows:

The human element in industry and production is the one fundamentally essential element; all other elements are supplemental in their relation. Modern machinery supplements the human effort—it does not supplant it. The modern farm, with all its modern equipment, including the truck and tractor, still requires the farmer. Truly, he has been supplemented by this modern equipment and thereby made much more efficient, so that he is able to produce more than he was able to produce with such equipment. It is very essential that he be furnished this equipment, including trucks and tractors, when they are required by him in the raising and transporting of foodstuffs, especially in these days when the wastage of war is demanding of the American farmer food products far in excess of usual high production.

The human element in production was never more prominent than at the present moment. Notwithstanding this fact, it is true that the human element in industry has had less constructive consideration at the hands of the American manufacturer and business man than other elements that enter into any given product.

We took good care of our machine tools, cutting tools, and other equipment; also, we selected carefully the materials that go to make up our product, but the help question was a question of hiring and firing. It took the Great War to wake up the American manufacturer and business man to the problem of the human element in production. The hiring and firing program soon disappeared; the Government came along and said, "Stop using human effort on non-essentials; if you use human effort at all, use it on essentials such as we will assign to your plant."

A great many were taken out of their former positions and taken to the shipyards, the munitions plants and other war material producing plants. Rates of wages were paid that established an entirely new standard among us. Production was recognized by additional money rewards, the hours of labor strictly limited and great emphasis laid on the conditions and surroundings under which men worked, emphasizing the fact that men were men and must be treated as such; not to be looked upon as a commodity to be dealt in for profit, but the one fundamentally essential element in industry, the human element—with strong emphasis on the human.

This brought a stream of gold and a glow of self-respect to the American workman and his family, which has lifted him out of the conditions under which he toiled formerly and lifted him to a plane of life where he and his family secured more of the necessities and comforts of life than he had been able to formerly—a higher plane of life from which he will never recede to his former position in the community. Many are the dangers and many are the benefits to him and the community that surround him in this new place.

But he is there and he will stay there. Those of us who use this human element in industry had better recognize it and lay our future plans accordingly, and it was with this point in mind that this paper was written for you. It had perhaps better be entitled "The American Workman in His New Position in Society and His Relation to Production."

The need of increased production, no thoughtful man will question in this day when consumption exceeds production in many of the essentials of life as well as the comforts of life. The increasing of wages without increasing production can but result in the increasing of prices and the end of that program can lead only to very serious results. This has been recognized by several of the crafts among organized labor, as well as a strong demand that the profiteer in food, clothing and shelter should be treated as a criminal. But if all the profiteers in all essentials were eliminated, which should be done at once, nevertheless much of the problem would still remain. Not until the American workman sees that the only permanently effective way to reduce prices is to have production equal and exceed consumption in any given commodity, it being understood that all profiteers will be kept properly jailed. When production exceeds consumption—then and not until then will prices come down and necessities and comforts be available to all. Let it not be overlooked that the American workman, in his new and higher plane of life, has created new markets which will consume vastly greater quantities of products than ever before and the only way to meet this demand of the American workman is to produce more per hour worked.

This is the very heart of the problem and should be squarely met and handled. How can we get greater production per man hour worked? This can be done, and is being done in some of our plants.

Illustrations will be drawn from facts and figures realized in one of these plants. We cannot at this time overlook the fact that certain fundamental facts and principles govern in the successful handling of this human element in production.

First, we must recognize that the element is "human." It is not mechanical or animal, but human. It is prominently true that the human phase of handling men and women in industry has been sadly neglected and, altogether too frequently, labor has been looked upon as a commodity to be dealt with at will. The day is here when the worker in the shops is no longer classed with the equipment of the institution but associated with the human beings who constitute the Board of Directors and the owners of the business to whom the Directors are responsible.

The humanity of the human element in industry is rapidly being recognized by the wideawake management. From the employment man at the gate, who interviews those applying for work down through the General Superintendent to the smallest "straw boss" in the shops, the word has been passed along by the management that every employee, no matter what his or her place may be in the organization, must be treated first as a human being and then as an employee. In other words, the human element is the most important element in the business. The deal between him and the company must be absolutely square and above board. He can sit down with the Employment Manager and discuss any phase of his relation in the plant or his family needs or anything else that concerns the common interests between himself and the company. The Employment Manager shall function fully as the only final link between the workman and the management. Wages, grievances, condition of work, bosses, or anything else along this line may be brought up, and when so brought up, must receive attention. He has become a partner in the business and continues as such as long as he is employed.

We have heard much of late about labor desiring a part in the management of business, but the writer is convinced that all that labor wants along this line is a chance to say what should or should not be done as touching his immediate relation to the business. He does not want to shoulder the responsibilities of finance or sales, etc., but he does want to help manage the conditions under which he works, the material and equipment that concern his job and the wages he receives, and, in these, he is well qualified to function. This foundation is essential in order to build upon it the superstructure of increased production per man hour worked. The human element in industry is pre-eminently human, and must be handled from that viewpoint. This element is possessed of mental capacity which must be reckoned with and should be carefully guided and used. **It has been well said that the mental attitude of the worker toward the company is even more important than his physical skill in his work.**

We now have before us this human element, which has not only a strong body but also a human heart and mind, a man. In this man, as truly as in any other man, mind controls matter. Therefore, if we are to increase production with him, let us see to it that we get him thinking right, and in order to get him thinking right we must ourselves think right.

Let me here ask the questions, "Why are we here considering the subject of increased production?" "Why was it that the recent session of the Chamber of Commerce of the United States held at Atlantic City built its entire program for that convention on the subject of increased production?" "Why does anyone want increased production?"

We answer by referring to the reason previously stated—the waste of war made it necessary and to reduce prices. Very good, but what in the last analysis is the answer to "why do we want increased production?" In order that the financial returns may be increased to us and that thereby we may secure more of the necessities and comforts of life and possibly also some of the luxuries. That is true, and it is equally true of the workman in the offices and shops of our plants, and he will respond only to the extent that we are able to bring this about for him. This is the underlying motive principle which must be applied or continued increased production per hour worked cannot be realized.

He must be paid in the ratio of production secured from him, and that without endangering his future. That is, he wants to know that the permanency of his job is not affected by his increased production.

These two things well installed in his mind, namely, that he will profit in the ratio of his production and that his job will last, will cause him to respond permanently. This is an assertion based on experience of one and one-half years without any indication that the peak

of the curve has been reached—the results being greatly increased earnings by the worker without increase in cost to the company per unit. How is it done?

In reply, we use here only the records and experience in this plant of the direct producers as distinguished from the indirect workers. That is, it includes the records of the machine operatives and assemblers, but does not include the stock men, sweepers, inspectors, etc.

At the close of the war, this plant found itself with a labor condition that was anything but desirable, but on a par with most other metal cutting plants throughout the country. Wages per hour were high as compared to pre-war basis and production per hour worked was very low. The mental attitude toward the company was not constructive for quick rehabilitation after the war. While prices for the necessities of life were forcing the worker to ask for higher wages, the resulting turnover of labor was very high, all of which was showing up in the cost of the product. The problem was how to enable the worker to meet the ever-increasing cost of living by enabling him to earn more money, and at the same time not increase, and if possible, reduce the cost of unit produced. Both were satisfactorily realized by the following processes:

After several months of conferences with superintendents, foremen, and workers, it was decided to adopt a differential scale of wage payment based on production. In this plan all machine and assembly jobs were to be divided into classes about ten in number. Each of these classes were to be paid a certain base rate per hour. The simpler jobs were put into the classes paying the lower base rates per hour, while the more highly skilled operations were put into the classes paying the higher base rates.

This base rate per hour was the current rate paid in the community for such jobs. Each operation was carefully time-studied by practical men who function as standardization men, and these, with the foremen and superintendents, also at times the operator of the machine, decided on what constituted one hundred per cent efficiency. When this was decided and agreed on the operative was, within two weeks, expected to reach this 100 per cent efficiency in production for the hourly base rate paid him. For every one per cent additional production over 100 per cent he was paid two-thirds of one per cent on his hourly rate and this was averaged over his total production for the pay period. The elements entering into production were recognized as four distinct elements, namely, the equipment with which the operative worked, including machine and cutting tools, jigs, fixtures, etc.; the materials on which he worked and which enter into the product; the conditions under which he worked, such as light, heat, ventilation, hours of work, dining room, service, etc., and fourth, the man himself. These four elements were recognized as the elements of production. The company, through its indirect organization, assumed the first three, i.e., the equipment, the materials, and the working conditions, holding the worker responsible only for the fourth element, namely, the man himself. All four elements must be kept up to standard in order to demand from the operative standard performance. A report daily was compiled showing the efficiency of each worker in each department, based on the elapsed time according to calculagraph records and count of pieces finished. This report was ready at 9 o'clock each morning for the day preceding, having been made up by night clerks. All operatives who were less than one hundred per cent efficient were recorded in red, all others 100 per cent and over in black. An efficiency crew was organized under the Tool Room Superintendent, whose business it was to investigate each report in red, i.e., below 100 per cent and report to the General Superintendent which of the four elements was causing the low efficiency. It is the duty of the General Superintendent to see to it that the cause is removed. If it is equipment, he puts the Master Mechanic on the job; if it is bad material, he puts the material supervisor on the job; if it is a bad condition, he sees that it is removed, making sure that the first three elements are in standard condition before the man himself is blamed for the low efficiency.

If it is found to be the man himself, he is helped and is taught how to do the work, but if he continues to fail, he is either put on another job or let out. The latter, however, is done only after repeated trial and opportunity. It is understood, however, that nothing under 100 per cent is satisfactory. It is also fully understood that no matter what efficiency a man makes, his rate will not be cut as long as the job continues. Should the tooling be changed and the time study accordingly changed, the operative must make at least ten per cent more than he did under the old method, providing the gain is at least 10 per cent to the company by the new tooling. Assemblies and sub-assemblies are time-studied in groups and the efficiency of the group is the efficiency of each member of the group, whatever class he may be in. The plant works the 44-hour week. All overtime is paid on the basis of time and one-half on the hourly base.

What are the results? The answer is that the results have demonstrated the success of the plan, both to the workman and the company concerned, because the earnings to the men have been greatly increased while the cost of the product per unit produced has not increased to the company. One year and a half ago the average efficiency, according to a given standard of 100 per cent, was between 62 and 65 per cent. The average efficiency for the same work during the month of April, 1920, was 145 per cent. The earnings of the men increased from January, 1919, from 46 cents an hour to 71 cents an hour by May 15, 1920, an increase of 52 per cent. During the same period the cost per unit concerning the same operations was reduced 17.3 per cent.

In other words, the benefits accrued both to the workman and the company because of the increased production per man hour worked. The number of hours required to do this work was greatly reduced, as shown by the fact that the number of men on the payroll at the beginning was 15½ men per unit produced and on May 1, 1920, it was 8½ men per unit produced. The question will probably be asked immediately, what of the quality of the work? Careful records have been kept and the illustration of the last five months will indicate the tendency. In January, 1920, the percentage of defective workanship to cost of material and labor was 1.14 per cent., in February .644 per cent., in March .822 per cent., in April .763 per cent., in May .685 per cent. The relative average efficiencies were the following:

January	130 per cent
February	130 per cent
March	135 per cent
April	145 per cent
May	150 per cent

These are correct within two points. Therefore, the conclusion that earnings by the men have gone up 52 per cent, costs have been slightly reduced to the company, quality has increased in standard.

The human element in production, if properly directed by the management, will co-operate in the increase of productions to the profit of both employer and employee.

The FORUM

Autoignition and Spark Plug Location

Editor AUTOMOTIVE INDUSTRIES:

IN a considerable number of tractor engines, the spark plugs are mounted so that the spark gaps lie at the remote ends of ¾-in. passages communicating with the combustion space. The length of these passages, between plug electrodes and combustion space proper, varies in different cases from about 1 in. to approximately 2 in. This condition is at its worst in valve-in-the-head designs, and particularly where generously proportioned water jackets are employed.

Extension plugs are used in some of these cases, in an effort to bring the plug gaps into a more desirable position; and a favorite form of extension plug is one having a considerable length of sleeve integral with the shell.

Under the condition of full or nearly full load, preignition invariably results from such a plug emplacement, whether the plugs be extension or standard types, unless the compression ratio is so much reduced as to result in a material loss in thermal efficiency. The plug electrodes, being shielded from the turbulent and relatively cool charge, attain high enough temperatures to induce autoignition. The condition is usually much aggravated in extension plugs, because of the relatively greater mass of the heated parts, compared with the mass of charge that can come into contact with them to reduce their temperature. In such a case, the local rise in charge temperature will be much greater than in the case of smaller overheated parts. Furthermore, the bulk of the evidence points to the fact that the cooling effect of the fresh charge must be chiefly relied upon to control the electrode temperatures during charging and compression, since the only other path by which heat can leave the electrodes is a long and difficult one.

A remedy that has proven singularly successful in the laboratory is shown in Fig. 1. Here the original skirt extension and heavy center electrode are cut off, and long nichrome electrodes (No. 22 gage) substituted, the length being sufficient to bring the spark gap approximately ¼ in. inside the bounding wall of the combustion space. With this construction, the mass of overheated metal is almost negligible, by comparison. Also, heat is taken away from the wires at a high rate, by a comparatively very great mass of fresh charge, thus preventing the attainment of local charge temperatures high enough to cause autoignition.

The first result observed with the long small wire electrodes was an entire absence of preignition at full load. Furthermore, after long-continued running at open throttle, with the jacket outlet temperature at 206 to 208 deg. Fahr., the engine invariably stopped without once firing after breaking the ignition circuit. With the unmodified extension plugs, the engine would, under the same conditions, run quite regularly for some 30 to 60 sec. after discontinuing the electric ignition.

At the same time, great gains were made in the efficiency of fuel utilization, due to the superior spark gap location with the long wire electrodes. This is shown in Fig. 2, a plot of the possible utilizations in the two cases. The reason for this really considerable improvement is presented in Fig. 3, from which it appears that the chief advantage of the superior spark gap location resides in the fact that with it poorer mixtures can be used, without appreciable sacrifice of output.

P. S. TICE,
Director, Carbureter Division,
Stewart-Warner Speedometer Corp.

Wood Disk Wheel

AN automobile disk wheel made of wood has recently made its appearance after a series of tests both on the road and in the laboratory. The construction, which resembles in appearance the steel disk wheel, is of thin, rotary cut slices of wood, glued together under heavy pressure. The laminations are so built up that the grain of each piece runs in a different direction from that of the next piece, thus producing a result that is claimed by the makers, the Dayton Automotive Wheel Co., to be strong, non-warpable and thoroughly waterproof. Road shocks, it is declared, are distributed evenly.

Any standard demountable rim may be used with it and the hub and other steel equipment is that of the customary spoked equipment. A patented angle valve of attachment is applied in such a way that the tire may be inflated from the outside face of the wheel.

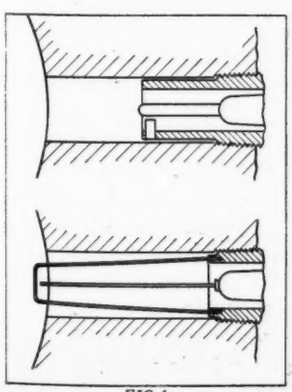


FIG. 1

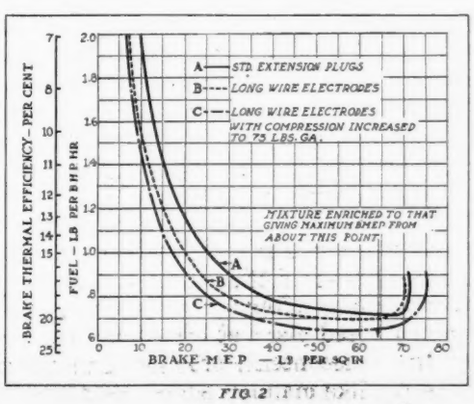

A — STD. EXTENSION PLUGS
B ---- LONG WIRE ELECTRODES
C — LONG WIRE ELECTRODES WITH COMPRESSION INCREASED TO 75 LBS. GA.
MIXTURE ENRICHED TO THAT GIVING MAXIMUM BMEP FROM ABOUT THIS POINT
BRAKE THERMAL EFFICIENCY - PER CENT
FUEL - LB PER B H P HR
BRAKE M E P — LB PER SQ IN

FIG. 2

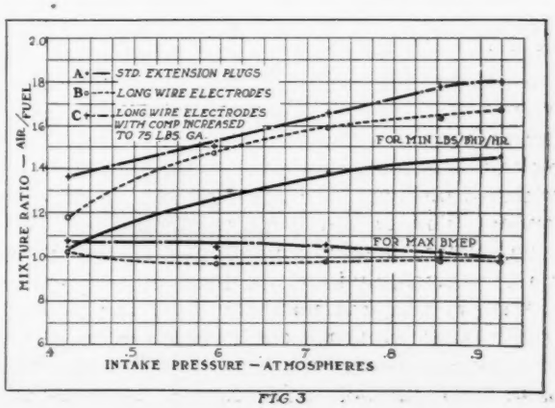

A — STD. EXTENSION PLUGS
B ---- LONG WIRE ELECTRODES
C — LONG WIRE ELECTRODES WITH COMP INCREASED TO 75 LBS. GA.
FOR MIN LBS/BHP/HR
FOR MAX BMEP
MIXTURE RATIO — AIR/FUEL
INTAKE PRESSURE — ATMOSPHERES

FIG. 3

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The AUTOMOBILE

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Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

Selling the Banker

RECENT mails have brought two exceedingly interesting communications on the present credit situation.

One was addressed by a truck manufacturer to the dealers who sell his products. His advice was to shorten the sales terms as sharply as possible. He minced no words in telling his dealers that he had been surprised to learn on what long terms some of the trucks had been sold. His advice was to reorganize the selling force, revise the prospect list and concentrate on the would-be buyers who had the most money. This entirely ignores the line of least resistance, which usually leads to the man who asks the longest terms, and certainly is sound advice.

The second communication is from a company which makes only truck engines. The company makes no trucks and has no direct line for selling to the public. The advice of the engine maker is addressed to assemblers who use his engine, suggesting that they, through their sales forces, present to all possible truck users that the truck is a highly essential transportation unit. It urges that the argument for the truck as a transportation unit be presented to the bankers who handle the dealers' business. Some interesting and instructive figures as to the use of trucks as compared with railroad equipment for short haul are given. The letter will make a sound basis for argument for the dealer who must talk to his banker.

These two letters, we believe, are entirely commendable. We would suggest one further step. It very often happens that a perfectly good truck dealer is not a successful conversationalist, especially when a banker is sitting on the other side of the table. In a case of this kind, we believe that it would be an excellent move for the factory to send a district salesman or a financial man from the factory to help the dealer in this interview.

It is more necessary now to sell bankers on the automotive industry than ever before. Time spent with a banker is well spent, and in talking to him always remember that the automotive industry is a transportation industry, not just a maker of vehicles.

Analyzing the Salesman's Job

SCIENTIFIC management is now applied almost universally in the shop and factory, whether it goes by that name or not. The work of every individual operator and of groups of operators is carefully planned, studied and regulated. Upon the results of this study are based the rates and methods of payment. Following this intensive development of scientifically arranged work in the shop, some executives have come to wonder if similar methods might not, to some degree at least, be applied to the work of the salesman and the sales force. They believe that scientific production cannot reach its maximum effectiveness unless it is correlated with a sales plan similarly scientific.

The Taylor Society recently held a conference in New York City for the purpose of discussing the possibilities along this line. As might be expected, no very definite results came about, the chief business of the meeting being the visualizing of the problem.

One pertinent suggestion came from Henry S. Dennison, president of the Dennison Manufacturing Co., as regards payment of salesmen on a commission basis. He compared the present system of paying commissions in most firms to the oldtime method of letting foremen set piece rates "on a hunch."

Job analysis of the salesman's work has not yet really begun as compared with job analysis of the machinist's task, and until such analysis has been possible, commission payments are liable to be a hindrance rather than a help to the ultimate effectiveness of the sales program. Production rates are set only after much planning and study—in a well-organized plant at least—if they are not, an infinite deal of discontent, trouble, and disorganization results. In like manner, some executives have come to believe, the salesman's job must be analyzed and his rates of pay determined.

Acknowledged, with Thanks

THIS is an acknowledgment to the Daily Sae, printed for the Society of Automotive Engineers at Ottawa Beach by a group of wise advertising men, for a splendid tribute to AUTOMOTIVE INDUSTRIES. This tribute was entirely unconscious, we believe, but, nevertheless, was fully appreciated, and we cannot permit so signal a service to pass acknowledgment.

As a part of the publishing program for the Daily Sae, there were gathered from many eminent and practical manufacturers opinions as to how the S. A. E. could best serve the industry in its newly undertaken activities to help solve the problem of production. There was a very interesting program on this subject at the semi-annual meeting, the first undertakings of this kind by the society. We will give here a digest, extremely brief, of the opinions of the manufacturers:

Turn public opinion toward highway problems.
Advise on transportation problems.
Good roads, short haul and store door delivery.
Persuade engineers to keep production in mind.
Co-ordinate engineering, sales and production.
Make engineers more familiar with production problems.
Promote education in the necessary increase of man-hour production.
Bring about co-operation between the engineers and designers of truck parts and the foundries that must produce the parts.
Devise plan for co-ordinating all parts of the factory.
Devise increased facilities for saving man power, especially in indirect productive labor.
Analyze labor pay systems.
Build broad-minded, well-trained practical executives.
Compile data on manufacturing methods of cars, trucks and parts.
Urge parts makers to live up to specifications.
Outline efficient machine tool operation.
Exchange ideas among works managers.
Persuade the public to be less extravagant in taste.
Promote manufacturing co-operation.
Better the co-operative spirit between capital and labor.

THIS is a summary of all of the opinions published except one. That one was based on a reference to the over-production of "pleasure cars." Frankly, we do not know of "pleasure cars."

If the reader of this editorial will turn back to the published conception as to the mission of AUTOMOTIVE INDUSTRIES—printed three years ago when this magazine succeeded *The Automobile*—he will read there, and in later announcements, all of the lines of endeavor mentioned before and some others. The conception of this magazine, as then outlined, was to a considerable extent a novel one. AUTOMOTIVE INDUSTRIES was conceived to become all that its name implies, and it was to treat and lead in subjects of direct interest to the industry. This included the industrial or labor phase, engineering, the obligations of the industry to its component individuals and to other persons, the standard methods of production, and the modifications of these methods by the introduction of new machinery and processes. This has been our pronounced intention and we have worked faithfully toward this end.

Practically everything suggested in the above opinions has been treated in AUTOMOTIVE INDUSTRIES, and most of them will continue to be a part of our publishing program. It is true that we have not said a great deal on some of the subjects, chiefly because we have been unable to discover the proper sources of material. We will continue to search for the sources of this material and to present it as soon as it becomes available. The fact that these topics are suggested indicates that there is a lack of material.

One or two points are raised, for which we may seek to prove the negative. For instance, we do not believe that the public should be less exacting as to its demands for cars, nor that those who can pay for luxuries should not demand them from the builders. But in the main, we think so well of the points made in the résumé and in the conception of our magazine, that we shall continue to work along these lines and we believe that the problems are so far from solved that we advise the S. A. E. to think well of the suggestions offered.

In addition there are other points in the ideals of AUTOMOTIVE INDUSTRIES. We are surprised that no one suggested further standardization of many parts of the vehicles. This certainly will do much to promote production. We shall point out the innovations and the production qualities of the new vehicles, and we shall, above all, continue to urge upon the industry the value of frankness, honesty, good fellowship within its own ranks and with the more humble helpers, and the proper use of its great power and publicity. If comment is to be offered, we would say that at present the industry is suffering a very heavy loss because it does not avail itself of the proper publicity, the spreading of information of the great advances it is making in manufacturing, engineering and in the useful science of transportation.

Foreign Money Markets Tighten

Conditions in Britain Same as in America

Reconstruction Brings Manufacturers Tight Money and Slump in Demand

MANUFACTURERS in the United States who feel that after-the-war reconstruction is affecting them more seriously than their brothers in England, France and other countries, are in error.

Present conditions in England are almost identical with those in the United States. This applies with especial emphasis to the automotive industry. These are some of the problems with which British manufacturers have to contend.

Tight money and shortened credit.

Increased cost of materials.

A slump in demand resulting from the growing caution of the buying public.

The following news letter from the London correspondent of AUTOMOTIVE INDUSTRIES tells something of conditions which prevail on the other side of the Atlantic.

LONDON, June 25 (*By a Staff Correspondent*)—There has been a general tightening up of money in the British engineering trade. Several factors are operating causes.

Banks are calling in over-drafts and refusing new ones. This affects both makers and potential buyers.

Credit is shorter and terms of settlement are more rigid. This includes shorter dating of loans and bills.

Materials cost three times as much as before the war, and as a consequence the motor trade is beginning to feel anxious about the future.

There is evidence of a slump in demand both for cars and trucks. As regards cars, the reasons are belated deliveries and the public's deepening sense of caution which is leading to retrenchment. There is likely to be a surplus of new cars soon as output is nearing its peak for this season. More and more makers are looking to the foreign markets to take their cars.

In the case of trucks, one of the chief factors is the throwing on the market of many thousands of re-conditioned war trucks of two or more tons capacity. Upwards of 40,000 of them have been sold in England. Orders are short because other trades are being curtailed and are not in the field for additional equipment.

The part of the truck trade which remains in healthy condition is confined to the light commercial vehicle and the small van.

There has been a heavy slump in the tire trade, attributed to the following:

Delay in production of British motor vehicles.

High cost of tires due to inflated price of cotton.

Tightness of money due to heavy taxation.

Economy of everybody but the Government.

Tire Imports Growing

British tire manufacturers are complaining because free importation of tires is permitted, but the public generally can see no especial reason why tires should be singled out for import restrictions unless the same policy is applied to other commodities. It is undeniable that there is a growing demand for American straight edge tires and it is probable the slowness of British makers to adopt American ideas may be responsible for the falling off in their business. Certainly cotton fabric costs them less than it does American manufacturers, for much of that used in the United States is made in Lancastershire mills.

Fear is felt in many quarters of an impending shortage of gasoline. One of the steps advocated to solve the problem is cultivation of a home fuel supply. For this supply benzol, a tar distillate from coke works and gas works, is relied upon as the chief constituent.

Benzol advocates sought legislation requiring gas manufacturers to increase their output of benzol by 100 per cent but their plea was denied. The present output is about 20,000,000 gallons a year, although during the war it was about twice that quantity.

LOWER CAR PRICES DISTANT

DETROIT, July 12—Investigation in sixteen automobile factories shows that manufacturers see no prospect of price reductions before Jan. 1. As a matter of fact there have been many price increases in the last two months, ranging from $50 to $450. Prices of the following cars have been raised in that period: Briscoe, Cadillac, Cleveland, Columbia, Essex, Franklin, Haynes, Hudson, Hupmobile, Jordan, King, Maibohm, Oakland, Packard, Peerless and Studebaker. The Cole Motor Co. also has put into effect an increase on closed jobs only.

DOUBLE CAR SPACE AT SHOW

DETROIT, July 10—The Michigan state fair will virtually double the size of its automobile exposition this year. Two floors instead of one will be devoted to their display.

British Imports Outweigh Exports

Business in First Five Months of Year Shown by Foreign Balance

LONDON, June 9 (*Special Correspondence*)—The official returns show that Great Britain in May imported 3847 cars and trucks and 1146 chassis. The respective values were cars and trucks $5,474,095 and chassis $1,915,210. Parts and equipment for cars and trucks were imported to the value of $2,212,565. Motorcycles and parts therefor were imported to the combined value of $119,550. Tire imports had a value of $1,575,205.

British motor exports in May were eight cars and trucks to British South Africa, 311 to other countries; nine chassis to British South Africa and 217 to other countries. The combined values were $1,220,315 for vehicles to South Africa and other countries, and $810,690 for chassis to South Africa and other countries. The value of chassis parts exported was $841,225. Motorcycles exported totaled 1599 valued at $601,750, and parts therefor, $238,660.

For the first five months this year Great Britain imported 14,327 motor vehicles, 5316 chassis, and 193 motorcycles. The values were $22.284,830 for vehicles; $10,130,253 for chassis, and $14,407,410 for parts. Motorcycles and parts were valued at $710,890. Tires imported were valued at $10,081,340.

Exports in this period were 64 motor vehicles and 19 chassis to British South Africa and 1142 vehicles and 719 chassis to other countries. The gross values respectively were $4,338,275, vehicles, and $2,599,735, chassis. Gross value of parts exported in the five months was $3,414,790. Five months exports of motorcycles totalled 6389 machines valued at $2,376,220. Parts exports totaled $1,113,465. Total tire exports were $12,732,095.

PACKARD PLANES LAID OVER

DETROIT, July 12—The Packard Motor Car Co. has given up for the present its intention to manufacture airplanes commercially, and will turn its attention entirely to engines and engine installation development. The Packard company has recently developed a line of three aviation engines, the largest of which is a twelve-cylinder, 600 hp. type of 2025 cu. in. piston displacement. These engines will be used in government and commercial freight hauling and passenger planes, but will not be installed on Packard planes for the present.

Steel Mills Face Temporary Closing

Million Tons of Finished Material Await Lifting of Rail Restrictions

NEW YORK, July 12—No improvement is apparent in the transportation situation. In fact it has become so serious for the basic industry of steel that the mills are considering seriously the advisability of shutting down for ten days or two weeks. Many plants are being kept going mainly by the use of motor trucks. More than two-thirds of the daily output of some of the large works in the Pittsburgh district is being moved in this manner, supplemented by the use of river barges.

Congestion has increased because of the order of the Interstate Commerce Commission sending open top cars to the coal mines and closed cars to the grain sections. As a consequence stocks of finished material awaiting shipment in the Pittsburgh, Shenango and Youngstown districts total 1,000,000 tons. Frozen credits in this form present another pressing problem even for the strongest producers.

Hearings were given by the Interstate Commerce Commission at Washington last week to shippers in various lines of industry and to railroad executives in the hope of finding some solution of a situation which is slowly strangling industry. Daniel Willard, president of the Baltimore & Ohio and chairman of the advisory committee of the Association of Railway Executives, declared priority of service in favor of the more essential commodities was necessary.

"I do not think it will be necessary to wholly curtail the movement of any particular kind of business," Willard said, "but I do think it will be necessary for a time to give preference to certain particular kinds of business more important than others from the public standpoint."

This is interpreted to mean that in the opinion of railroad officials food and fuel must be moved ahead of everything else. This is what the I. C. C. is trying to do and the lack of cars for other interests is the result. No relief is in prospect and none can be looked for until more equipment is provided and the morale of the railroad organization is improved. As the winter comes on it is likely conditions will become still more acute.

Must Unload Cars at Once

Willard urged greater co-operation on the part of shippers in releasing cars quickly so that the railroads can get the maximum use of them. In this connection the Commission on Car Service has issued the following order to the chairmen of the car service committees of railroad operating officials which are located at the principal centers.

"It has been brought to our attention that in many cases shipments of automobiles are delayed and held in cars due to consignee's inability to promptly lift bills of lading.

"It is desired that you watch this situation and in cases where shipments of automobiles are not unloaded promptly arrangements should be made with the carrier to unload them into storage at the owners' expense in accordance with tariff provisions and report cases so handled to the Commission on Car Service."

Special Cables

PARIS, July 12 (*By Cable to* AUTOMOTIVE INDUSTRIES)—Belgium is the latest of the European countries to attempt by heavy tariff imposts to prevent the importation of foreign made automobiles and tires. The following increases in duties are announced: Automobiles, 240 francs per 100 kilos (a kilo is 2.2046 lb.); solid tires, 130 francs per 100 kilos; pneumatic tires, 232 francs per 100 kilos; tubes, 340 francs per 100.

German manufacturers of automobiles, trucks, tractors and bicycles have petitioned the Government for the abolition of special export taxes.

A British government prohibition against left drive cars is expected. If such an order is promulgated it would affect French and American manufacturers.

Germany has delivered the airship L-72 to the French at Maubeuge. Another airship, the L-120, will be delivered soon under the terms of the peace treaty.

The value of French automotive exports for the first four months of 1920, according to figures which have just been compiled and made public, was nearly twice as great as the value of the imports. The figures are: Exports, $49,646,800; imports, $26,003,600.

The British aviation show opened yesterday at Olympia. It is almost entirely British as there is only one foreign exhibitor.

French manufacturers have voted definitely against holding an automobile show this year. The next exhibition will be in the fall of 1921. The only 1920 automobile shows in Europe will be held in London and Brussels.

SHERIDAN OUT IN AUGUST

NEW YORK, July 12—General Motors contemplates the expenditure of approximately $5,000,000 on reconstruction and additions to the T. W. Warner and Inter State Motor Car Co. plants at Muncie, Ind., at which the Sheridan, the latest car to be added to its string will be produced. Production of the Sheridan will begin by Aug. 1, it is expected. There will be 4 and 8-cylinder models. The lighter car will sell at about $1,500 and the heavier at around $3,000.

DORT PRICES ADVANCE

FLINT, MICH., July 12—To cover increased cost of production, prices of Dort cars will be increased July 20 as follows: Touring and roadster, $1,085; fourseason sedan and coupe, $1,765. The prices are f.o.b. factory.

Money Tightening Stabilizing Trade

Results Thus Far Show Legitimate Business Not Hampered to Serious Extent

DETROIT, July 12—Financial conditions throughout the country, especially as affecting the automotive industry, were discussed by W. J. Gray, first vice-president of the First and Old National Bank of Detroit and Harry Harper, president of the N. A. D. A. at the July meeting of the Detroit Automobile Dealers' Association at the Detroit Athletic Club. A feeling of optimism was engendered by the speakers who stressed the fact that what at first glance appeared a staggering blow at the industry was destined to prove of value.

Gray, who is in close touch with the industry as well as the financial situation, assured the dealers that there was no disposition among bankers to squeeze or to seriously handicap the automobile industry and urged that the action of the banks simply was in the nature of a precautionary measure. He contended that already wholesome effects of the tightening of the money market were becoming apparent and said manufacturers and dealers were rapidly becoming convinced that legitimate business would not be hampered and that financial aid to a reasonable extent could be counted upon.

President Harper gave the local dealers some inside facts regarding the situation in other cities but throughout his talk there was a note of cheerfulness. He did not attempt to blind the dealers to the fact that the financial situation had checked the demand and had worked great hardship on dealers throughout the country, particularly in sections where the Reserve Bank edict had been more literally construed and applied. He predicted a rapid return to a steady normal demand and declared the temporary stringency in the money market would prove a benefit to the industry.

National Tractor Show Set for February 6

COLUMBUS, July 12—The National Tractor Show will be held on the Ohio State Fair Grounds here the week of Feb. 6, according to W. J. Longbon, president of the Columbus Tractor and Implement Club, recently organized to promote and manage the show. Plans have been made to secure the co-operation of the Ohio State University College of Agriculture, the Columbus Chamber of Commerce and various business and civic organizations.

As has been previously announced, this show will be the only National show of the season. Other shows were discontinued and the entire efforts of its backers will be devoted to making the Columbus show a success. Applications for space in the two large exhibit halls are coming in rapidly.

Ford Buys Railroad to Get Coal Supply

Detroit, Toledo & Ironton Changes Hands—Buys Vast Timber and Mineral Tract

DETROIT, July 12—Details of the use to which the Ford Motor Co. will put the Detroit, Toledo & Ironton Railroad, the purchase of which by the Fords became known this week, are being withheld by the company until plans are more fully matured. Simultaneous with the announcement of the railroad purchase it became known that 400,000 acres of virgin timber and mineral land in Northern Michigan had also passed into Ford possession. A report that the Ford company also was negotiating for Kentucky coal properties could not be confirmed.

The railroad purchase is said to insure to the company and the city of Detroit an uninterrupted supply of coal. The road taps the coal fields of southern Ohio, West Virginia and Kentucky, and is said to be capable of supplying all Detroit industries with fuel.

Fifteen railroads cross the right of way of the newly purchased line, and through these the company will obtain direct freight connections to practically all parts of the country. The road includes 454 miles of main track, 155 miles of sidetrack, 85 locomotives, 3200 freight cars, 27 passenger coaches, and four round-houses. There are 2000 employees who will work on the Ford factory plan as regards wages, hours, housing and profit sharing methods.

The land tract was purchased from the Michigan Land & Iron Co. It includes 165,000 acres of hardwood timber, 100,000 acres of second growth timber, and shows pronounced indications of mineral deposits. Officials said if iron can be mined and marketed profitably on the tract it would be developed extensively. A closed body plant and saw mill near Republic, Mich., are planned. All wood equipment will be cut here and shipped direct to assembling points.

In connection with the timber purchase, the company is said to plan conservation methods and will go in for scientific reforestation to preserve the source of supply.

Ford Wins Victory in River Rouge Fight

DETROIT, July 12—The United States Circuit Court of Appeals has affirmed the lower court in refusing to enjoin the dredging of River Rouge on application of the American Agricultural Chemical Co., and other interests. The decision is a distinct victory for the Ford Motor Co. The chief allegation in the petition for injunction was that the proposed improvement would be injurious to the property along the river and of benefit solely to the Ford Motor Co.

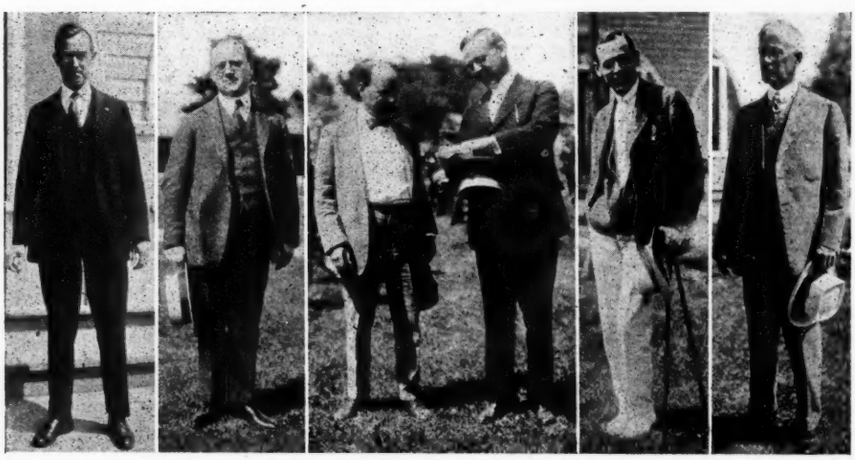
Plans now are being formulated at River Rouge plant for vast extensions to the blast furnaces and it is said to be the idea of the Ford Motor Co. to produce all of the steel required in the manufacture of its products eventually. At present chief efforts at the Rouge plant are being centered in the manufacture of closed bodies.

The appellate court's decision recites that the proposed improvement is fully authorized by act of Congress and adds that any damages accruing as the result of the condemnation of plaintiff's property can be ascertained and awarded. The injunction was sought to prevent condemnation of property to permit of the dredging and widening of the Rouge channel.

WHEEL ADDITION FINISHED

LANSING, MICH., July 9—The new machine shop at the Automobile Wheel plant, a unit of the Motor Wheel corporation, is completed and employment will be given to 50 additional men, adding considerably to the plant output.

Snapshots at the S. A. E. Meeting



Reading from left to right, they are: E. L. Clarke, F. M. Germane, A. J. Scaife, R. H. Johnston, B. B. Bachman, Christian Girl

Embargo Fails to Cut Coal Shortage

Southern Road Building Awaits Movement of Coal to Get Supplies

ATLANTA, July 10—Contrary to the first belief and an apparently authentic report from Washington that the Interstate Commerce Commission had no intention of holding up road work in declaring an embargo for coal cars, the embargo is now in effect including all open top freight cars for use for any other purpose than hauling coal. It apparently has not been modified in any form and therefore naturally includes all cars used in the transportation of building materials for use in road work.

The result is that millions of dollars worth of good road work in the Southern states is going to come to an automatic halt in the very near future unless something is done to modify the embargo. In Georgia alone $7,000,000 worth of road work will be affected and a similar ratio in other states of the Southeastern area.

The Birmingham Slag Co. of Birmingham, Ala., which supplies considerable of the road building material used in Georgia and other nearby states, has already been compelled to shut down its plant because of this embargo, and other plants in this section will be similarly affected in the near future. When the embargo became effective every car in the pits of the Birmingham company was seized for the transportation of coal.

The embargo was placed for thirty days but there is no probability that the mines in the Southern Appalachian district at least will be able to catch up with their orders in this length of time, and this will probably mean an extension of another thirty days, and possibly the embargo may run for a period of 90 days.

GEAR COMPANIES CONSOLIDATE

DETROIT, July 12—Incorporation of the Standard Gear Co. reveals the consolidation of five gear manufacturing plants with capitalization of $100,000. The new corporation is located at 700 Commonwealth Avenue in a modern plant containing 20.000 ft. of floor space. Dell A. Mead is president of the corporation and his brother, W. R. Mead, is vice-president.

Spur, sprocket and spiral gears are being turned out by the factory. The corporation is a consolidation of the Langtry Machine Co., the W. M. B. Machine Co., Michigan Standard Gear Co., Detroit Standard Gear, and Mead Mfg. Co.

FRYAC UPHOLDS TRADE NAME

ROCKFORD, ILL., July 12—The Fryac Mfg. Co. has been granted a permanent injunction restraining the Graves Cycle & Automobile Supply Co. of Bay City, Mich., from misuse of the trade name "Fryac" in connection with cut-rate advertising. A claim for damages was waived by the Fryac company.

British to Try Out New Power Alcohol

Motorists to Get Weekly Supply for Experimentation—To Modify Legislation

LONDON, June 12 (*Special Correspondence*)—According to the American Chamber of Commerce in London, the new Empire Motor Fuels Committee, just formed in Great Britain, is about to release several thousand gallons of power alcohol weekly to motorists, that experience may be gained in its use.

A section of the Finance Act, now before Parliament, provides for the repeal of the legal bar at present placed on the use of denatured alcohol for traction or other power purposes and also gives conditional authority to use it for all power purposes.

It is understood, says the American Chamber of Commerce, that the British Board of Customs and Excise will shortly approve the denaturing of alcohol for power purposes with as little as 3 per cent of methyl alcohol added and will grant to power users permission to employ other denaturants. As the addition of methyl is compulsory to the extent of 5 per cent and adds at least 9d. per gallon to the cost of power alcohol, the value of the concessions will be readily understood.

During the war, experiments were made by the London Omnibus Co., which was provided by the Government with a supply of power alcohol to enable it to work a fleet of motor omnibuses on that fuel mixed with benzol and the results are said to be wholly satisfactory. These experiments are now to be extended to other commercial motorists. With a surplus of molasses in sight, one ton of which is said to produce 65 gallons of alcohol of motor fuel strength, and with prohibition in America, large supplies of power alcohol will shortly be available, and as gasoline is likely to get more costly and scarcer, the British public feel that no time should be lost in removing restrictions on substitutes.

GEORGIA LAW HELD VALID

ATLANTA, July 10—The state highway fund of $1,700,000 is now available for road work in Georgia, as the result of an opinion handed down Tuesday by the State Supreme Court declaring the state highway act constitutional. This reverses a decision of a lower court given several days ago, declaring the act unconstitutional because of some minor technicality in its passage before the General Assembly.

SAYERS TO START NEW MODEL

CINCINNATI, July 12—Sayers and Scoville will shortly begin production of their new 1921 model, Sayers Six Roadster. The new model will be furnished with the regular Sayers Six chassis, touring car size which is equipped with the 7-R Red Seal motor, Delco ignition, Willard battery and has a 118-in. wheelbase. Sayers and Scoville are now operating their plant at full capacity and are doing everything possible to increase production, and keep up to the increasing demands. They report there is apparently no indication of a slackening up from sales among distributers. Many districts are demanding more Sayers Six cars than can be supplied. This company reports a shortage of certain kinds of skilled labor, especially high-class body makers and finishers.

Another S. A. E. Convention Group

Reading from left to right, they are: C. S. Whitney, Willard; E. O. Spillman, Herschell-Spillman; F. E. Moscovics, Nordyke and Marmon; C. E. Jeffers, Nordyke and Marmon; George P. Dorris, Dorris Motors

Firestone Sees Further Drops in Car Demand

NEW YORK, July 12—Harvey S. Firestone, president of the Firestone Tire & Rubber Co., sailed on the steamship Olympic for an inspection of his company's interests in Europe. Before leaving he attributed the slowing down of the tire industry to the slackening in demand for automobiles, caused in part by the bad weather of May and June.

"I believe the slowing down of the automobile business is bound to go further, although I would like to assume an optimistic view." he said.

Firestone said there is a slight overproduction of crude rubber at present and the price is about 38 to 40 cents, or virtually what it was during the war. He expects a rapid increase in demand for American tires abroad when automobile production gets into its stride in Europe.

RESTRAIN CARBURETER COMPANY

GRAND RAPIDS, MICH., July 12—An injunction has been granted on application of the Corbett-Vanden Bos Carbureter Co., restraining the Great Scott Vaporizer Co. from manufacturing and selling a carbureter known as the Great Scott Vaporizer. The plaintiffs claim patents on the carbureter which were perfected by C. A. Corbett and John Vanden Bos belong to the plaintiff company. An agreement for royalties on a similar carbureter the petition alleges never has been carried out.

Coast Fuel Rations Show Further Drop

Independent Supplies Fail to Meet Demand — Many Stations Completely Dry

PORTLAND, ORE., July 12—The gasoline shortage here which recently seemed to have attained its peak, with conditions improving, has within the past week become worse than ever. There seems small prospect of adequate relief before August or perhaps September. The supply here Saturday was so short that many filling station tanks were entirely dry. At no place could passenger cars obtain more than 2 gal., regardless of tank capacity, the usual ration being 1 gal. only. This is a reduction even from the drastic rationing of 20 per cent of tank capacity.

Arrival of a gasoline tank steamer with 1,250,000 gallons aboard yesterday has relieved the situation only a little as this supply may have to last three weeks. Normally Oregon uses 4,000,000 gal. monthly.

The Dealers' Motor Car Association of Oregon, in its efforts to relieve shortage conditions throughout the territory which have greatly curtailed sales of automobiles, has contracted for immediate delivery of a trainload of 250,000 gal. from Wichita Falls, Texas.

The coming two weeks, according to oil company officials, are likely to see a shortage worse even than has yet befallen this unhappy State.

CLARK PISTON TO BUILD

LOS ANGELES, July 10—The Clark-Turner Piston Co., manufacturers of a gray iron piston, have been so successful with their product that they have acquired an extensive land holding and will erect a modern factory building soon. The first unit of the plant will accommodate 200 employees and have a capacity of more than 3000 pistons daily.

Receivers Named for Argonne Car

Inability to Complete Cars Bankrupts Jersey Company—Reorganization Looked For

NEWARK, N. J., July 12—Receivers were appointed in Federal Court here yesterday for the Jersey City Machine Co., manufacturers of the Argonne automobile. The action was taken upon the petition of three small merchandise creditors whose claims aggregated about $1,000. The petition was filed at the request of the company to forestall a sale of assets by the Hudson County National Bank to satisfy a judgment. The company wished to avoid having preferred creditors and wanted them all in the same position.

The receivers named are Floyd Ramsey and Judge Haight of Jersey City. The petitioning creditors were George Krause, F. B. Brill and the Bergen Iron Works. The receivers have sent a letter to creditors but no date has been set for a meeting. It is said that reorganization plans are under way and that it may be possible to keep the plant in operation. It will not close for the present at least.

Financial troubles of the company are attributed to an unbalanced inventory resulting from transportation difficulties. It had on hand an adequate supply of some of the parts used in the car but it was unable to obtain other parts and under the circumstances production was impossible. Quantity output had not been reached, although some cars had been turned out. The liabilities are estimated at about $65,000 and the book value of the assets will exceed that amount, although it is not known what they would bring under a forced sale.

Otto R. Bieler was the father of the Argonne car and he organized the Automotive Engineering Co. with headquarters in New York to market it. This was early in 1919. It was planned to produce from 100 to 150 cars last year and sell them for about $4,000 each, but this program was not carried out.

The car was designed to appeal to a buying clientele close to the top of the list in purchasing power. One of the unusual sales "talking points" was a guarantee of 70 miles an hour speed and 20 miles to a gallon of gasoline.

Gardner Car Company Announces Incorporation

NEW YORK, July 12—A company has been incorporated in this state to take over the business, assets and good-will of the Gardner Motor Car Co. of St. Louis. It will have an authorized capitalization of 300,000 shares of no par value of which 155,000 shares will be issued. Fifty thousand shares will be offered for public subscription by a syndicate composed of Hornblower & Weeks of this city and Lorenzo E. Anderson & Co. of St. Louis. The offering price, it is understood, will be $27 a share.

The president of the new company will be Russell E. Gardner, former head of the Banner Buggy Co., and organizer of the Chevrolet Motor Co. of St. Louis, which assembles and distributes the Chevrolet car in the Southwest.

More than 3,000 cars have been produced since Jan. 1, and the estimated production for this month is 1,000 cars. The company makes a light 4-cylinder car of low price which has found a ready sale in the St. Louis territory.

*Exports of Automobiles, Airplanes, Trucks, Farm Tractors, Motorcycles and Parts for *May and 11 Previous Months*

	MAY				11 MONTHS ENDING MAY, 1920			
	1919		1920		1919		1920	
	NO.	VALUE	NO.	VALUE	NO.	VALUE	NO.	VALUE
AIRPLANES	4	$40,000	17	$214,000	47	$617,600	59	$430,694
AIRPLANE PARTS		63,483		198,633		11,249,456		633,827
COMMERCIAL CARS	1162	2,445,071	3194	4,858,026	11154	29,298,274	21656	37,353,150
MOTORCYCLES	2639	794,175	4324	1,144,467	11271	2,930,108	32484	8,860,537
PASSENGER CARS	5218	5,517,121	14990	16,434,244	33412	37,527,142	103146	111,414,363
PARTS, NOT INCLUDING ENGINES AND TIRES		3,812,393		8,380,764		32,657,496		58,859,57

Engines

	MONTH OF MAY				11 MONTHS ENDING MAY, 1920			
	1919		1920		1919		1920	
	NO.	VALUE	NO.	VALUE	NO.	VALUE	NO.	VALUE
AUTOMOBILE, GAS	3740	$ 533,052	3973	$623,319	24196	$3,734,981	35313	$5,396,830
MARINE, GAS	873	384,898	1368	390,850	7008	3,661,367	9147	3,154,036
STATIONARY, GAS	2117	263,675	3260	578,180	21575	3,053,160	25752	3,948,332
TRACTOR, GAS	969	1,019,247	2280	2,469,812	18777	20,321,140	18517	17,726,255
TOTAL	7699	$2,200,872	10881	$4,062,161	71556	$30,773,648	88729	$30,225,453

Automobile Exports by Countries for May and 11 Preceding Months

	MAY				11 MONTHS ENDING MAY, 1920			
	CARS		TRUCKS		CARS		TRUCKS	
	NO.	VALUE	NO.	VALUE	NO.	VALUE	NO.	VALUE
DENMARK	101	$115,747	15	$22,662	2280	$2,625,081	664	$1,427,864
FRANCE	51	115,131			809	1,197,839	1392	5,900,681
NORWAY	390	502,281	82	125,203	2514	3,075,651	815	1,543,038
SPAIN	365	486,014			2453	3,040,780		
UNITED KINGDOM	2193	2,516,342	641	964,365	15372	16,894,144	3773	5,608,823
CANADA	1292	1,822,349	307	594,000	9073	11,343,809	2196	3,919,759
MEXICO	112	119,341	62	154,244	2489	2,063,266	928	1,216,142
CUBA	1123	910,719	257	474,589	4218	4,146,017	1419	3,073,853
ARGENTINE	312	372,652	85	194,630	3049	3,469,529	300	597,123
CHILE	190	191,654			544	610,505		
URUGUAY	366	303,345			2601	2,468,778		
BRITISH INDIA	855	926,494			935	1,175,588		
DUTCH EAST INDIES	307	399,816			7002	7,588,676	440	944,451
AUSTRALIA	854	920,562			5128	5,600,928		
NEW ZELAND	188	241,262			4547	5,142,716		
PHILIPPINE ISLANDS	273	238,050	140	156,385	2073	2,183,662	698	1,019,226
BRITISH SOUTH AFRICA	1064	1,194,066			5110	5,727,369		
OTHER COUNTRIES	2923	2,917,461	1139	1,618,969	18348	18,758,016	6964	9,161,085

***The export table in Automotive Industries of July 8 was for the month of April.**

KENTUCKY TIRE TO BUILD

LOUISVILLE, July 9 — Application for permit to erect a $75,000 factory at Thirty-second Street and the K. & I. tracks was filed by the Kentucky Tire & Rubber Association with the city building inspector.

DETROIT ROADS HELD BACK

DETROIT, July 10—The road building program in Wayne County which got away to a record start at the beginning of the year has been halted by the switchmen's strike and transportation congestion. From the present outlook it is doubtful if more than 15 miles of paving will be laid during the year. More than $1,500,000 must be spent for new bridges in the plan outlined for road construction, according to E. H. Hines, chairman of the board of county road commissioners.

This will include rebuilding of practically all bridges in the county in addition to the new ones to be constructed. The commissioners are making every effort to keep the roads in condition for traffic with the limited material at hand, but see little chance for making much progress on the new road program this year.

Tire Exports for April

COUNTRIES	AUTOMOBILE TIRES			
	Casings	Inner tube	Solid tires	All other tires
	Dollars	Dollars	Dollars	Dollars
Azores	58,539	6,910	628	.....
Belgium	61	13	.....	.....
Czechoslovakia	125,528	5,251	.....	.....
Denmark	61	13	.....	.....
Finland	125,528	5,251	.....	.....
France	21,000	2,400	2,155	.....
Germany	113,986	13,929	492	.....
Gibraltar	29,837	10,356	.....	.....
Greece	161	30	.....	.....
Hungary	84,634	4,653	.....	880
Italy	760	.....	.....	.....
Malta, Gozo, and Cyprus Islands	62,995	5,953	.....	.....
Norway	48,140	2,560	428	.....
Poland and Danzig	86,139	11,308	30,681	.....
Portugal	37,629	3,040	.....	.....
Roumania	8,334	656	3,974	.....
Spain	90,623	27,623	10,543	60
Sweden	191,778	23,113	125	4,861
Switzerland	124,349	6,405	.....	.....
Turkey in Eueope	5,478	377	.....	.....
England	230,282	21,566	14,846	4,029
Scotland	6,375	80	.....	.....
Ireland	123	.....	.....	.....
Yugoslavia, Albania, etc.	2,000	.....	.....	.....
Bermuda	.....	.....	.....	39
British Honduras	690	25	.....	.....
Canada	183,472	16,555	50,827	2,634
Costa Rica	1,196	220	.....	31
Guatemala	5,417	2,913	.....	.....
Honduras	925	210	75	13
Nicaragua	3,353	369	19	.....
Panama	33,846	1,410	1,191	416
Salvador	12,930	600	.....	.....
Mexico	71,677	8,961	10,913	4,550
Miquelon, Langley, etc	20	.....	.....	.....
Newfoundland and Labrador	653	93	.....	125
Barbados	3,607	277	160	.....
Jamaica	8,033	479	358	156
Trinidad and Tobago	14,836	1,623	1,804	160
Other British West Indies	900	85	.....	56
Cuba	165,965	29,424	21,587	5,238
Virgin Islands of U. S	1,012	29	.....	1,011
Dutch West Indies	1,422	280	.....	60
French West Indies	1,522	.....	183	85
Haiti	4,141	408	.....	.....
Dominican Republic	15,816	3,057	1,404	1,526
Argentina	211,037	21,821	4,600	7,398
Bolivia	5,412	1,856	.....	.....
Brazil	96,677	17,796	10,210	1,571
Chile	20,970	1,715	3,646	.....
Colombia	7,141	1,137	1,781	46
Ecuador	2,826	.....	.....	.....
British Guiana	2,160	339	.....	.....
Dutch Guiana	486	.....	.....	.....
French Guiana	201	.....	.....	.....
Peru	14,858	2,296	2,229	140
Uruguay	31,565	2,902	3,208	1,536
Venezuela	24,090	3,720	627	100
Aden	982	248	.....	.....
China	31,131	2,637	4,438	.....
Kwantung, leased territory	3,462	.....	.....	.....
Chosen	4,770	1,985	.....	15
British India	54,429	8,928	18,728	.....
Straits Settlements	153,565	8,722	13,818	849
Other British East Indies	9,894	3,662	.....	382
Dutch East Indies	35,503	4,100	35,797	4,000
French East Indies	.....	234	.....	.....
Hongkong	2,345	.....	.....	958
Japan	50,748	8,436	2,022	962
Persia	650	200	.....	.....
Siam	1,757	90	.....	.....
Turkey in Asia	2,510	728	.....	120
Australia	113,459	6,342	4,563	154
New Zealand	84,402	10,929	53,623	2,561
Other British Oceania	2,101	.....	.....	.....
French Oceania	1,935	48	596	81
Other Oceania	55	.....	.....	.....
Philippine Islands	143,414	14,845	16,223	8,500
British West Africa	58,688	11,623	.....	.....
British South Africa	84,819	12,762	.....	347
British East Africa	4,652	320	.....	.....
Canary Islands	200	50	.....	.....
French Africa	14,188	4,560	.....	.....
Morocco	140	25	.....	.....
Egypt	10,665	2,407	.....	2,384
Total	3,148,845	370,520	328,502	58,034

DETROIT PAYS $21,500,000 TAX

DETROIT, July 12—Motor car manufacturers in the Detroit district paid the Government $21,500,000 in automobile excise taxes for the first four months of 1920. This covers the 5 per cent Government tax paid by automobile buyers and represents the purchase of about $430,000,000 worth of motor vehicles from Detroit in those four months.

Continued expansion of the automobile industry is revealed in the fact that this $430,000,000 worth of business by Detroit producers in four months, which is at the rate of $1,290,000,000 a year, compares with $1,885,112,546 as the value of the total passenger car and motor truck output of the United Staes in 1919.

Conferees Discuss Publicity Dispute

Agreement Expected Whereby Legitimate News Will Get Space —No More Puffs

NEW YORK, July 12—A dozen representatives of the automotive industry and ten newspaper publishers had a friendly conference yesterday on the subject of automobile publicity. As a result of the meeting it is probable a working agreement will be reached which will enable the motor car makers and dealers to get into the columns of the New York papers the actual news of the industry.

The conference was entirely amicable. Each side was willing to admit it was at fault. The publishers were in a receptive mood and it was their proposal that the automotive interests prepare for submission at a subsequent meeting an outline of what they felt would be fair treatment of news originating with them. The suggestion met with favor and such a program will be outlined.

It was agreed on both sides that there must be a change in the character of the automobile pages. Representatives of the industry admitted they had grossly offended in the past by the character of publicity sent out and the publishers agreed that they had handled their automobile pages in such a haphazard manner that many evils had crept in for which neither manufacturers nor dealers were responsible.

There will be no attempt in future to get space for gratuitous "puffs" which possess no merit whatever as news. If any such publicity is sent around it will get no consideration from editors. It was agreed, however, that millions of persons have a direct personal interest in automobiles and that actual news concerning them is entirely legitimate, even if it does now and then contain the name of a manufacturer, a dealer or a car. In fact much news of this character would have no value if these names were eliminated. A case in point was the Indianapolis sweepstakes. The papers printed the names of the winners but made no mention of the cars they drove.

Industry Leaders Attend.

The industry was represented at the conference by Harry T. Gardner, secretary of the New York Dealers' Club; Harry J. DeBear of Maxwell-Chalmers; William J. Poertner, president of the dealers' club and the Poertner Motor Car Co.; L. J. Eastman of Packard; E. S. Underhill of the United States Rubber Co.; Alfred Reeves, general manager of the National Automobile Chamber of Commerce; J. S. Marvin and J. C. Long of the same organization; M. L. Schuster, assistant general manager of the Motor and Accessory Manufacturers' Association, and three factory advertising managers, H. C. Dart of Paige-Detroit, L. B. Dudley of the Federal Motor Truck Co., and C. W. Mears of Winton.

Material Shippers Favored by Ruling

Get Share of Open Top Cars After Protest—Truck Importance Shown

WASHINGTON, July 14—Vital dependence of all industries upon motor transportation when the railroads fail in their mission, was strikingly illustrated in the testimony of representative witnesses at the hearings before the Interstate Commerce Commission on July 8, 9 and 10, on the question of distribution of open-top cars. It was clearly demonstrated to the commission that the motor truck was becoming more than supplementary to the railroads. These facts were adduced in refutation of charges that the automotive industry was more or less nonessential.

The hearing was brought primarily to protest against the commission's service order No. 7, giving priority for thirty days, from June 21, to movements of bituminous coal east of the Mississippi River. Shippers of construction materials and related industries complained against the discrimination.

Despite numerous and varied suggestions as to relief measures, the commission to-day issued service order No. 9, amending and supplementing for 30 days service order No. 7. It cleared up the question as to what type of equipment constitutes "coal cars." The commission exempts from the classification "flat bottom gondola cars with sides less than thirty-six inches in height, inside measurement, or cars equipped with racks, or cars which on June 19, 1920, had been definitely retired from the service for the transportation of coal and stenciled or tagged for other use."

This ruling will permit shippers of road materials to meet their obligations on a larger scale than was possible under the blanket order. The commission's specific injunction to stop the abuse of the reconsignment privilege of coal will permit a better movement of open-top equipment for other uses en route to mines.

Virulent Attacks on Industry

While the shippers of automotive products made no official representations at the hearing, the attacks upon the industry as a whole became so virulent and without foundation in fact that M. O. Eldridge, of the American Automobile Association, took the stand to set the commisson clear on the subject. He refuted the statements of several witnesses that the automobile was solely a "pleasure" vehicle and cited statistics to show that only 10 per cent of automobiles are used exclusively for pleasure purposes. Reference was made to the Pullman and passenger cars on the railroads. Eldridge said that fully 10 per cent of the passengers who ride on the railroad trains are not riding on account of business but merely for pleasure.

As to the practical utility of motor trucks, Eldridge referred the commission to the testimony before the Senate Committee in which it was stated that 1,200,000,000 tons of freight were carried over the highways by the 750,000 trucks owned and operated throughout the country. He insisted that trucks were essential to the movement of coal, road materials and food products.

R. E. Riley, traffic manager, Silica Sand Association of northern Illinois, advised the commission that as a former dealer in motor trucks he was confident that a 2½-ton truck would handle more freight in a day than the railroads are able to handle with a car of forty or fifty tons capacity.

Big Companies Use Trucks

W. S. Guy, traffic manager, Carnegie Steel Co., told of the dependence of the steel industry on the motor truck as a means of transportation. He cited an instance in one plant which manufactured 49,000 tons of material in June and shipped 29,000 tons by truck. He called the attention of the commission to the fact that it is the small customers that suffer when the railroads prove inefficient, inasmuch as their more powerful competitors, by purchases of fleets of trucks, are in a better position to meet the emergency. The Duquesne plants of the Carnegie Steel Co. have been trucking over 50 per cent of their output.

It was Herman L. Matz, of the Chicago Association of Commerce, who suggested that the commission shut off the movement of box cars loaded with "automobiles and other non-essentials." William H. Duval, county attorney for Cook County, Illinois, urged that the railroads be instructed to allow the transportation of sufficient materials for the maintenance of highways. He argued that motor trucks would assist the railroads in relieving the transportation congestion.

Lafayette Announces Prices on New Car

NEW YORK, July 14—Prices on the various models of the new Lafayette car were announced to-day by H. C. Porter, New York distributer.

The prices follow:

Touring	$5,625
Coupé	7,200
Sedan	7,400
Limousine	7,500
Chassis	4,750

All of these figures are f.o.b. Indianapolis, and do not include the war tax.

The first car is expected to be on the floor of the New York salesroom within two weeks, and the production program provides for a gradual increase during the summer, most of which will be absorbed, it is believed, through the New York distribution point, where a particularly heavy demand has developed since the first Lafayette was shown in the lobby of the Hotel Commodore during the New York show in January.

Kearny Assembling 75 Fordsons Daily

Two-thirds of Output for Domestic Markets—Balance for Latin America

NEW YORK, July 13—Assembly of Fordson tractors has commenced at the Ford assembly plant at Kearny, N. J., near here, at the rate of 75 daily. This work has been in contemplation for some months, but the assembly lines have just been completed and sufficient parts received from the home factory to enable production to get under way.

Of the machines made up here, two-thirds are for domestic consumption, going to the Atlantic seaboard districts. The remainder are for export, going principally to the West Indies and Central and South America. Sales to the West Indies and Central America are now being made direct from the Ford offices here, while those to the South American countries are being continued by Sherman & Sheppard, the Fordson representatives for that district but who also are handling the Ford agricultural lines for the entire district.

Of the Fordsons being built at Kearny for export, none are going to Europe, as the Fordson plant at Cork has reached sufficient production to handle that territory adequately. Although figures as to the output at Cork were not available at the Ford offices here to-day, it was stated that this plant was destined for a heavy increase. The Ford company is expecting a heavy European business on tractors, as well as cars, when conditions in Eastern and Southeastern Europe become more settled and when trading with Russia becomes possible again, and the plant at Cork will be called upon—with the one at Copenhagen for cars and trucks—to supply that business.

Figures were given out at the Ford offices to-day to the effect that shipments of parts now are getting under way to the assembly plant at Manchester, England, which will admit of a production there of 8000 cars monthly. The output there for the last two months has approximated some 1000 cars a week.

To Demonstrate Tractors

Plans are being made by the Ford foreign office to send a number of tractor and agricultural demonstrators to both the West Indies and Central America, as a part of the tractor sales campaigns in those districts. Ford and his agents have completed much tractor research work in Latin America, believing that such information was necessary to sales upon a broad scale. Demonstrations have been found by the Ford company to constitute a strong selling force in the export field, and they are being held throughout the foreign territories covered under the supervision of the New York export office.

Foreign Aircraft Dumping Enjoined

U. S. Court Decree Forbids Sale Here

British Machines Held by Judge Chatfield to Infringe Wright Patents

NEW YORK, July 14—Fundamental American airplane patent rights—as granted originally to Orville and Wilbur Wright—have been upheld decisively against foreign infringements, by a decree of international significance handed down by Judge Thomas I. Chatfield in the Brooklyn Federal Court.

The decree, which perpetually prohibits the Interallied Aircraft Corporation of New York from using or selling airplanes in this country, is certain, American manufacturers declare, to have a profound effect on the controversy over the dumping into the United States of foreign-built, obsolete airplanes which has engaged Congress and the country for several months.

The Wright Aeronautical Corporation of Paterson, N. J., owner of the Wright patent in the United States, which won the suit against the Interallied, has a similar suit pending against the Aerial Transport Corporation, incorporated in Delaware.

The Curtiss Aeroplane & Motor Corporation of New York also announces that it has begun litigation against the Aerial Transport Corporation for violation of fundamental Curtiss patents in the United States.

The Aerial Transport Corporation has been the center of activity in the plan to throw into the United States thousands of obsolete British-built aircraft and engines at prices so low that, were general distribution successful, the American industry, it is asserted, would be practically put out of business. It was stated by representatives of the company at a recent Congressional hearing that the Aerial Transport Corporation had an option on half of the British surplus, which is understood to be 15,000 airplanes and 20,000 or 30,000 engines.

Wright Patents Stand

The Chatfield decree, American aircraft manufacturers state, makes clear that the basic Wright idea which made flight possible in heavier-than-air machines, cannot be copied in this country, notwithstanding the fact that the foreign privilege of using the Wright invention was sold or leased to foreign interests.

The patent involved in the Chatfield decree was U. S. Patent No. 821,393, which covers the Wright means for maintaining and restoring lateral equilibrium whether by warping the wings or by ailerons or otherwise. Rights to the invention in certain foreign countries, including Great Britain and France, were granted to companies in these countries.

The British Wright Company, owner of the British patent, in a statement in *The Aeroplane* for Oct. 4, 1916, announced that it had settled with the British Government, on payment of £15,000 for past, present and future use of the British patent on all British Government machines. The company, however, reserved to itself the British rights for sporting and commercial purposes.

There have also been payments of very substantial royalties by practically every French manufacturer of airplanes during the war to the French Wright Company, amounting to millions of dollars, according to statements in newspapers of January this year.

"Judge Chatfield's decree," says a statement authorized by the Wright Aeronautical Corporation, "is interpreted to mean simply that the Wright patent in America is unimpaired by any privileges which may have been disposed of in other countries."

Commercial Companies to Get Navy Planes

NEW YORK, July 14—Surplus navy aircraft valued at approximately $20,000,000 has been purchased by the United Aircraft Engineering Corp. of this city and will be sold to commercial aviation companies and to individuals. The equipment includes 144 Liberty motored HS2L flying boats, which cost $18,480 each; 29 two-motored flying boats which cost $33,159 each; 12 F5L machines with a wing spread of 140 feet which cost $39,200; 91 Aeromarine training planes, 2 Curtiss Gnome speed machines; 47 Boeing seaplanes; 10 kite balloons and a large number of motors, iscluding 360 of the Liberty type.

The navy assumed responsibility for all this aircraft when it was accepted and it is in good condition. Purchasers of it will have the advantage of being able to get service. parts and advice concerning their machines, which will give them a decided advantage over persons who buy aircraft of foreign make.

N. A. C. C. Offices Moved

NEW YORK, July 14—The National Automobile Chamber of Commerce is moving this week from the Grand Central Palace, where it has been located temporarily, into its permanent headquarters in the new Marlin-Rockwell building at Madison Avenue and Forty-sixth Street.

Russia Banned from Automotive Exports

Sweeping Injunction Modified on Other Countries—No Immediate Business Seen

WASHINGTON, July 14—Although resumption of trade relations with enemy countries has become effective under regulations laid dow.- by the War Trade Board section of the State Department, a prohibition has been placed against the shipment of automotive equipment of any kind to Russia. This applies to a limited extent, also, to Hungary, Austria, Turkey and Bulgaria, although the restrictions to these countries are not so sweeping.

The list of commodities, export of which is forbidden to any of the enemy countries, includes armored motor cars, aircraft of all kinds, including airplanes, balloons and their component parts, together with accessories and articles suitable for use in aircraft. The ban against shipments to Russia also includes freight or passenger motor cars and their component parts.

Inasmuch as the list of prohibited articles for enemy countries other than Russia does not include motor cars, it is permissible to export this equipment under special export license.

Exporters Study Situation

Automotive exporters at New York have been somewhat in doubt as to the interpretation of the regulations concerning the trade with Russia, but only a few of them believe that much immediate business is in sight, even if all restrictions were flatly withdrawn. However, several plan to take advantage of the first opening for such trade and believe that export connections of a possibly profitable nature may be arranged.

The General Motors Corp. has had a representative at Warsaw, Poland, for some time, but few reports have been forthcoming from him that would indicate development of extensive Russian trade at this time.

Exporters here have had numerous inquiries not only from Russia but from other states in southeastern Europe. In most instances, long time credits of as high as five years have been asked or plans were submitted by which purchase money would be held in the hope that the exchange fluctuations would restore it to more nearly normal level. All of the exporters here were greatly interested in the possibilities of such trading and it was believed that the first sales, whatever the quantities might be, would be of tractors and trucks.

News Bulletins

WASHINGTON, July 15—Aroused by protests of California automobile dealers associations at the inactivity of Federal agents, the Department of Justice has wired explicit instructions to the United States district attorney for northern California to conduct a thorough and expeditious inquiry into allegations that the gasoline shortage on the Pacific Coast is artificial and that it has caused a slump in demand for cars and trucks.

Dealers in Los Angeles and San Francisco allege that the delay is due to political considerations. The department asserts that the complaints were forwarded to Federal officials as soon as they were received and that action cannot be taken until the investigation is completed. The dealers contend that the shortage has been engineered by the oil companies to enable them to increase prices and that there is no actual shortage of fuel.

GRAND HAVEN, MICH., July 15—A. L. Martin, who has been manager of the dealers' department of the Four-Wheel-Drive Co., Clintonville, Wis., has been appointed general sales manager of the Hamilton Motors Co., makers of Apex trucks. H. A. Oswald has retired as chief engineer of the Quaker City Corp. to become chief engineer of the Hamilton company. Both have been connected with the automotive industry for many years.

DETROIT, July 15—Henry Ford and the Ford Motor Co. will pay off to-morrow the remainder of the $60,000,000 commercial paper credit arranged a year ago. The payment will amount to $35,000,000. The original credit arranged was for $75,000,000 but the Fords never availed themselves of all of it, using only $60,000,000 and the payment to-morrow will clean the debt off their books.

NEW YORK, July 15—J. P. Morgan & Co. announced to-day that more than 99 per cent of the 3,223,291 shares of common stock of the General Motors Corp. recently offered by them had been subscribed for by stockholders of the corporation at the time of closing the subscription books and that the underwriting syndicate will be dissolved.

NEW YORK, July 15—Directors of the Manufacturers Aircraft Association, at a meeting yesterday, re-elected as president Albert H. Flint of the L. W. F. Engineering Co. A. V. Crary of the Curtiss Co. was added to the board.

Origin Marks Urged by British Committee

LONDON, July 1 (*Special Correspondence*)—International action to obtain greater uniformity of laws and procedure covering merchandise marks is recommended by the British Merchandise Marks Committee in a report to the Government. If the recommendations are adopted, the Board of Trade will have the power to make an order requiring indications of origin to be given on all imported goods. Particular attention will be directed under the plan to ascertaining whether the goods were manufactured, produced or sold under circumstances constituting unfair competition. In this way dumping would be singled out for particular attention. Provision is included for final appeal of disputes to the League of Nations.

Report Willys to Take Curtiss Buffalo Plant

NEW YORK, July 12—Manufacture of motors, parts and accessories for airplanes will be continued in the Buffalo plant of the Curtiss Aeroplane & Motor Corp. Only the airplane construction department will be removed to Garden City, where all the airplane construction of the company will be concentrated. In this connection it is reported in Buffalo that the John N. Willys interests have acquired the factory there and will enlarge it for motor construction in connection with automobile production.

In June, 1917, the Willys-Overland Co. obtained complete control of the Curtiss company for a period of approximately 3½ years. That period soon will expire, which lends color to the reports from Buffalo. At the Willys office in this city, however, it was said nothing was known as to future plans for the Curtiss plant or what would be done when the agreement expired.

Triangle Stock Buyers Get Money Refunded

ALLIANCE, OHIO, July 13—Acting upon the request of John Price of Cleveland, president of the Triangle Tire & Rubber Co., stock subscribed through the Chamber of Commerce toward the erection of a plant will be cancelled and the payments, made to F. E. Dussel, trustee of the fund, will be returned

The original agreement called for the sale of $100,000 worth of stock by the Chamber, the majority of the board of directors to be chosen from Alliance. This sum was to be held in trust until $300,000 was raised elsewhere. and $100,000 by the promoters, making a total of $500,000. The proposition did not look attractive to outside capital as long as Alliance subscribed but one-fifth and yet was in control.

With the releasing of the subscriptions, an endeavor will be made to resell the stock to the original subscribers.

EXTEND CHALMERS DEPOSITS

NEW YORK. July 10—M. N. Buckner, chairman of the protective committee of the holders of first mortgage, 6 per cent, five year notes of the Chalmers Motor Corp., announces that note deposits under the deposit agreement dated June 15, 1920, may be made until July 20, inclusive, with the New York Trust Co.

Hare's Personnel Undergoes Changes

Members of Distributing Staff in Field and at Headquarters Moved Up

NEW YORK, July 13—The personnel of the distributing staff in the field and in the New York City headquarters of Hare's Motors, the controlling company for Locomobile, Mercer and Simplex automobiles, has been announced by Henry Lansdale, vice-president in charge of distribution and maintenance.

P. W. Hine, formerly distribution manager of the Locomobile division of Hare's Motors, has been made general distribution manager, with offices in New York, succeeding E. A. Travis. who has been placed in charge of the New York Locomobile branch. L. B. Waters has become manager of the specification department in place of H. C. Wessman, appointed to the position recently held by Hine. As general advertising manager, C. B. Morse, lately advertising manager of the Packard Motor Car Company of New York, has been named as successor to John A. Kingman.

Special field representatives are C. R. Norton, who was general distribution manager, and B. C. Helm, eastern distribution manager of the Packard Motor Car Co. of Detroit; H. S. Norton, vice-president, and for seven years in charge of distribution of the Packard Cleveland Co.; Fred H. Miller, general carriage sales manager of the Packard Pittsburgh branch; C. A. Kingsley, manager of the Locomobile branch in Pitsburgh; J. Murray Page, western representative for the Locomobile, and Erle E. Devlin, connected with the distribution organizations of the Buick and Paige factories.

Willys to Abandon Profit-Sharing Plan

TOLEDO, July 14—The 50-50 profit-sharing plan of the Willys-Overland Co. will be discontinued in all plants of the company, it is reported, to be replaced by the piecework system in all factory departments. If the plan is carried out it will become effective Dec. 31, of this year.

KING PRICES ADVANCE $150

DETROIT, July 10—Prices on all King models jumped $150 effective July 1. Present prices are as follows: Touring, $2,835; limoudan. wood wheels, cord tires, standard equipment. $2,535; foursome, wire wheels, cord tires, one spare wheel, $2,835; road king, wire wheels, cord tires, one spare wheel with tire, standard equipment, $2,850. The touring, limoudan and foursome are finished in king blue and painter's green. The road king is finished in carmine and khaki. The prices are f.o.b. Detroit.

Car Market Slumps Through Credit Ban

Distributers in New York Territory Stock for Future—Sales Fall Off

NEW YORK, July 15—Retail sales of cars, which have been in a slump since the tightening of credit began several weeks ago, show no signs of revival, and factory branches and distributers, as well as some of the dealers in the territory, are warehousing for future demand. The market is inactive from the lowest up to the highest priced cars, the general prediction that only medium priced products would suffer heavily having failed to materialize.

Cancellations have been heavy in practically all lines and "immediate delivery" advertising and sales talk is prevalent. Ford is the only car whose production is far behind demand. Naturally, day by day sales of this car are not up to the standard of a few weeks ago, but dealers are still behind on delivery and are booking new orders of prospects who, because of money scarcity or falling off in business revenue, have given up the idea of purchasing a higher priced unit.

The truck market is slightly improved over that of late June. It would be even brisker, in the opinion of dealers, but for the curtailment of credit to the financing corporations which are able, with the support obtainable from the larger banking interests, to accept only the higher class risks for time payment sales. Banks in the territory in most cases are financing dealers in stocking trucks, but except in the case of purchasers who are bank customers, are declining to handle time sale paper, which leaves dealers with no recourse but to the financing companies to dispose of stock on non-cash sales. Industries and mercantile establishments in all classes want trucks, but a good many are unable in the present emergency to buy them outright, and "live" prospects are lying "dead" on salesmen's hands as a result.

Dealers on Lean Margin

A good many small town and city dealers in the New York territory, both in the car and truck lines, are being forced into what approaches at least a straight garage business. Some with adequate capital or bank support are stocking merchandise, but others lack credit and are refusing stock offered by the metropolitan wholesale establishments. Travelers for the distributers and branches are going to the country banks with dealers, and some of these visits have resulted in a distinct loosening of money and a consequent resumption of the natural flow of merchandise. Other calls of this sort have proved fruitless, but the distributers are showing a disposition to repeat them in territories where relief is still denied, and there is indication that a "wearing down" process will bring about a gradual improvement in the situation.

The falling off in demand has brought some peculiar conditions into being. A dealer in two cars, one selling around $2,000 and the other around $1,000, finds the higher priced article in greater demand, which is exactly contrary to his anticipations. He accounts for it in the assumption that persons intending to buy $3,000 or $4,000 cars have found their incomes curtailed by the general business slump and have turned to the $2,000 job. On the other hand, intending buyers of $1,500 to $2,000 cars, suffering from the same financial ailment, apparently are not content to take a $1,000 job, and go without a car, while the ordinary $1,000 purchasers are fewer than lists indicated.

Results Show Padded Lists

A few makes of cars, said a short time ago to be "sold up to 1921," can be had on immediate delivery, which indicates that all along the line order lists were padded with names of persons who until their pocketbooks were cramped were shopping "anywhere to get a car."

In New York city salesrooms that were "decorated" a few weeks ago with half a dozen or more salesmen at a time are deserted now by everybody but the executives and the office force. The salesmen haven't quit—most of the dealers are keeping up and expect to retain their staffs—but they are out working the territory. Most of the cars that leave salesrooms now have been sold, not bought.

Enclosed cars are meeting sales resistance because of their cost and, particularly in the smaller communities, because of the opposition of bankers. Some of the latter are openly discouraging dealers desiring credit to stock enclosed cars, telling them that they should take touring cars to get faster turnover on their money. Distributers have come forward with the argument of the general utility and the all-year round market of the enclosed vehicle.

The demand for used cars is poor, and the oil and gas price increases, having a discouraging effect on touring, have brought about a slowing up of tire and accessory sales.

AUTOMOBILE SALON DATE SET

NEW YORK, July 12—The date for the automobile salon has been set for Nov. 14-21. It will be held in the great ball room of the Commodore Hotel. The main room, east and west wings and the foyer will be used.

Exhibits already assured are by Rolls-Royce, Renault, Lancia, Sunbeam, Delage, Locomobile, Daniels, Cunningham and Porter. Other exhibits are expected, especially from abroad. Custom body builders which will have exhibits include Rubay, Brewster, Brooks and Fleetwood.

FIRESTONE BUILDS IN CANADA

AKRON. July 14—The Firestone Tire & Rubber Co. has awarded contracts for the construction of factory units at Hamilton, Ont., to cost $1,000,000.

Investigation Shows Federal Bank Policy

Use of Funds Restricted to Member Banks—Tractor Loans Readily Made

KANSAS CITY, July 12—An investigation conducted by the Kansas City Tractor Club has disclosed that when the Federal Reserve Bank of this district has refused to rediscount tractor and other farm machinery paper it has not been due to the character of the paper. What has been characterized as discrimination against this class of security has been due rather to violation of the rules of the Federal Reserve system and the regulations pertaining to agricultural paper. Notes of this kind are discounted when presented and indorsed by a member bank.

The facts are that small state banks, not members of the Federal Reserve system, have passed their loans on to banks which are members and these banks in turn have had this paper recognized in the loans of the Federal Reserve Bank, which is absolutely contrary to the Federal Reserve act, showing that the bank in this district has been as lenient as possible with State banks in the past.

In a time of credit stringency like the present, however, the Federal Reserve feels that all its credit resources should be devoted to its own members and as a consequence these small banks have lost their most powerful financial assistance. If they were to come into the Federal Reserve system their loaning capacity would be increased 2½ times. If they were to enter it, however, they would lose some sources of revenue which they now enjoy.

The only tractor and farm machinery paper which the Kansas City Bank has refused to honor is that which has been indorsed by these banks and turned over by them to member banks, in violation of the provisions of the Reserve act.

Accessory Advertisers Discuss New Problems

NEW YORK, July 15—Discussion of maintenance and service problems formed one of the principal features of the third meeting of the Advertising Managers' Council of the Motor and Accessory Manufacturers' Association, which opened at Bedford Springs, Pa., to-day and will conclude to-morrow. J. C. McQuiston, manager of the department of publicity, Westinghouse Electric & Mfg. Co., presented a paper on "Accessory Advertising as a Help in Selling the Complete Car" which will be discussed from various angles.

Several group meetings were on the program, at which topics of special interest to certain branches of the industry were to be taken up. The arrangements for the meeting are in the hands of a committee of which E. C. Tibbitts of the B. F. Goodrich Co. is chairman.

Duryea Car First Asserts Builder

Two Years Ahead of Haynes and Apperson, He Declares—Formed First Company

PHILADELPHIA, July 13—Charles E. Duryea, a consulting engineer in this city, who is known personally or by name to everyone in the automotive industry because he was building "horseless carriages" when it was generally believed they were included in the things "God did not intend," still declines to give Elwood Haynes and the Apperson brothers credit for building the first automobile in use in this country.

In a review of his early activities, Duryea declares his work was done more than two years ahead of Haynes and Apperson. "Many of the facts," he says, "were stated under oath in the Selden vs. Ford suit and are uncontradicted matters of record. Hundreds of people saw my production. Assertions to the contrary at this late date may fool some but those who know or care to can get the facts.

Duryea says he first saw a gasoline engine at the Columbus, Ohio, state fair in 1886 and recognized it as the proper power for automobiles. As a consequence he devoted much time and study to gasoline engines in the later '80s. He began steady work on the automobile problem during the August shut-down of the plant of the Ames Mfg. Co. at Chicopee Falls, Mass, in 1891. The general design, long in mind, was reduced to definite form and a picture of the finished vehicle was made in January of the following year. This picture and the working drawings were "shown to literally hundreds that fall and A. B. Markham advanced working capital."

First Tests Prove Success

The machine work was done in the shop of John W. Russell & Sons and the carriage work in Smith's carriage shop. Continuing his narrative, Duryea says:

"I had gone East to get money and mechanics for both the cycle and auto work but when I found it wise to move the cycle work West I employed my brother J. Frank in March, 1892, and left him in charge after Sept. 10, 1892, when I moved to Peoria. His letters in my absence show without question the progress. I tested the car for power before leaving and found it satisfactory. It was finished in October, 1892—more than 13 months before Haynes began—but with winter coming on was not used much.

"It was modern in most details, however, tiller steering, C-shaped steering knuckles—later adopted by Haynes—spray carbureter, electric ignition, bevel differential, central speed-change lever, 4-cycle engine, 3-point suspension, chains from jackshaft to both rear wheels and friction transmission giving also a reverse, were used. All parts except the wheels, rear axle, battery and body with top were designed and built for this car.

The First Duryea, Built in 1892

The engine was rated at 1½ hp. but when speeded would develop more.

"So satisfactory was the first Duryea that we immediately began another of the same identical design but with larger engine and corresponding stronger parts. This was finished in the summer of 1893, a year before Haynes finished and several months before he began work. It was driven many miles about the streets and roads of Springfield, Mass., and its larger power and speed opened our eyes to a new market.

Began Second in '93

"From August to October, 1893, we discussed and decided upon and at once began a real automobile. Not a horseless carriage for $350 to $500 but with multiple cylinders, rubber tires, concealed mechanism in the body and on the springs, a vehicle to sell for $1,500 or more. We abandoned the horseless carriage before Haynes began.

"This third car was fitted with artillery wheels, 2-cylinder engine, individual clutch, 3-speed gear transmission with reverse, cushion tires changed to pneumatics in March, 1895—the first pneumatic used in America and perhaps in the world on automobiles, throttle control, parcel-carrying dash, radiating water tank under front with pump circulation, crankshaft lengthwise the vehicle with bevel gear to cross shaft and chain to rear axle. It was never towed. First run late in 1894, it was painted, tested and on the road in March, 1895, and run almost daily by a promoter seeking capital. More than a dozen cars, closely duplicates, were started in September, 1895, and the Duryea Motor Wagon Co.—the first American company to make gasoline cars—was organized."

Barge Canal Studied as Permanent Outlet

Mid-West Factories See Waterway As Better Means of Reaching Atlantic Coast

BUFFALO, July 12—Plans to utilize the barge canal, not only as a means of relieving congested freight conditions, but as a permanent method of transporting automobiles to the Atlantic seaboard, are rapidly being perfected by several mid-West manufacturers.

While the plans are said to ultimately call for mammoth barges, 200 and 300 feet in length, traffic managers of the various factories participating in the lake-to-sea all-water route scheme, propose at this time, it is said, to avail themselves of whatever equipment they may find at hand.

A representative of one of the big Detroit factories, now in Buffalo working out details of the plan, said to-day that when the full force of the motor car shipment traffic is felt here, Buffalo would in all likelihood receive and reship the major portion of the eastbound automobile traffic.

"When we actually get under way in the plans we have worked out I believe it will to a very great extent eliminate the difficult conditions we have been working under for the past two years," said the factory representative.

"There is no reason why the use of the canal should be a temporary measure. It offers a solution of most of our problems."

INDUSTRIAL NOTES

Patton Paint Co., Milwaukee, and its affiliated corporation, Pitcairn Varnish Co., are breaking ground for a four-story addition, 72 x 116 ft., and a two-story wing, 63 x 112 ft., to be ready about Oct. 1 and to serve mainly the varnish department.

J. I. Case Plow Works Co., Racine, Wis., has started work on a four-story manufacturing addition, 125 x 140 ft., to cost about $165,000 and to be devoted largely to the Wallis tractor department. The new building will be ready about Oct. 1.

Sewell Cushion Wheel Co., Detroit, has announced that direct factory assembly plants are under construction in Chicago, New York and San Francisco to meet the increased demand for its product.

Revere Motor Car Corp., Logansport, Ind., will start work next fall on the construction of an addition to its factory at a cost of $200,000. Plans have been prepared and contracts will be let this month.

Norton Co., Worcester, Mass., manufacturer of grinding wheels, has opened in Philadelphia an office of the grinding machine division, under the direction of Paul Hoffman, district manager.

Brunswick-Balke-Collender Co., Chicago, has made plans for erection of additions to its automobile tire manufacturing plant at Muskegon, Mich., to cost more than $1,000,000.

C. R. Wilson Body Co., announces that the addition to its Bay City plant is nearing completion and will be ready for operation within a few weeks, machinery now is being installed.

Superior Steel Castings Co.'s addition to its malleable plant at Benton Harbor will be ready for operation about Sept. 1, when 200 additional men will be employed.

Simplicity Wire Wheel Co., has added to is in operation in its new plant replacing the one destroyed by fire. The concern manufactures automobile wheels.

Simplex Wire Wheel Co., has added a nickel-plating plant to its factory. The addition is said to be the only electroplating laboratory north of Grand Rapids.

N. A. Petry & Co., Philadelphia, manufacturers of automobile ventilators, have opened their new factory and offices at 328-334 N. Randolph Street.

Gearless Motor Corp., Pittsburgh, Pa., is perfecting plans for the Initial unit of its new plant, which will cost $1,000,000.

Union Motor Car Corp., Eaton, Ohio, has filed notice at Dover, Del., of the change of its name to Washington Motor Co.

Firestone Tire & Rubber Co., Hamilton, Ont., has contracted for a factory to cost $500,000.

Hunter Motor Car Co., Harrisburg, Pa., plans to erect a factory at a cost of $250,000.

STERLING OUTPUT INCREASES

MILWAUKEE, July 12—In spite of the difficulty encountered in procuring labor, parts, railroad cars, etc., the Sterling Motor Truck Co. of Milwaukee during June effected a material increase in production, exceeding the high water mark of 250 trucks built in May of this year. The demand is reported to be by far the most pressing in the history of the company, dating back twelve years or longer. Although foreign business is not being pushed, more orders are being received from export sources than can conveniently be handled. An order was received during the week from a buyer in Java for thirty 2½-ton Sterling trucks, with pneumatic tire equipment. A representative in Denmark has sent two young mechanics to the Sterling factory in Milwaukee to become familiar with the construction and maintenance of the truck for service purposes in the foreign country, where a large number of Sterlings already are in operation.

Dunlop to Specialize on Cord Tire Building

BUFFALO, July 12—Work on the plant of the Dunlop-American Co., Ltd., is fast progressing. Already 12 buildings, each approximately 560 ft. long and 1120 ft. wide, of concrete, brick and steel, are under construction. It is stated by the building engineers that the structures will be arranged in units to increase efficiency in production.

A car line is planned to operate from Kenmore directly to the time room of the plant which will be the general entrance for employees. The workers will leave the car and enter directly into the time building. They will pass up a covered road to their departments.

It is reported that the concern will manufacture only cord tires. One of the features of the plant will be, it is said, the giant pneumatic. Provided nothing unforeseen occurs, the plant will be ready for elementary operations late in the fall.

INGERSOLL-RAND ADDS TO LINE

NEW YORK, July 12—Several new sizes of small portable pneumatic tools have recently been added to the line of "Little David" pneumatic tools manufactured by the Ingersoll-Rand Co. They include a small size of close quarter drill, a small high speed pneumatic grinder in two types and a lightweight drill furnished in two styles.

The close quarter drill is designed for work in difficult places and will handle work up to 1¼ in. diameter. The high speed grinders are designed for special work and have as a feature a three cylinder motor which runs in a bath of oil. The lightweight drills are designed to handle small drills without breaking them and have a very sensitive throttle control.

RACINE BUILDS HOUSES

RACINE, WIS., July 12—The Racine Rubber Co., western manufacturing division of the Ajax Rubber Co., New York, has started construction work on 200 dwellings which will be rented or sold to employees. The Racine works have recently been greatly enlarged and it has been found necessary to provide more housing accommodations to retain the present force as well as to induce new workers to enter the employment.

METAL MARKETS

WITH 1,500,000 tons of finished steel products piled up at the mills and their transportation waiting only upon modification of the I.C.C. order restricting the use of open car equipment to coal traffic; with June output of pig iron as well as steel ingots showing appreciable gains over May; and a strike in the rolling mills averted through renewal of the pact between the independent producers and the union, it would seem as though the market were due to turn more and more in buyers' favor. Much is made, however, of sporadic buying of the stop-gap sort at price levels lending themselves to interpretation as signifying a stiffening of values. This sort of business, however, is light, even in the aggregate and the fancy prices paid for immediate deliveries stress rather the exception than the rule. Pyrotechnical displays such as have been witnessed in the steel market earlier in the year, always have a way of flaring up just before they die down. Unmistakable is the symptom of specifications by automotive manufacturers slowing down and, while quite a few are negotiating for 1921 tonnages of specialties, like strip steel, when prices do not conform to buyers' ideas, they are left open for subsequent adjustment.

Pig Iron—In the Middle West, brokers are still offering pig from the Ford furnace or Ford reserves at $44, Detroit. The Ford Motor Car Co. has been extremely liberal in freight adjustments on tonnages that were en route. There is much talk of sales of foundry on a basis higher than $45, but on representative sales at over that level.

Steel—In spite of statements by this or that producer that he has advanced prices, demand from the automotive industry is slowing up. One Pittsburgh producer has raised the price of small bolts. An automobile builder is sounding the market on an order for 90,000,000 castle nuts. A number of Pittsburgh producers are reported to have advanced their strip steel quotations $10 a ton to 6c. base for hot rolled and 9c. for cold rolled. One automotive interest placed the greater part of its 1921 requirements with the larger strip makers, the price being left open for subsequent adjustment. Philadelphia reports the sale of cold drawn steel to an automotive consumer at 4½c. The United States Steel Corp. has turned down overtures to allot some of the steel piled up at its subsidiary plants to those who can haul it away with motor trucks. The corporation takes the position that this steel belongs to those who ordered it as much so as if it had been shipped to them.

Aluminum—No slowing down in the demand for aluminum from the automotive industry is noted. The resale market is in light supply and steady.

Copper—It remains to be seen whether the advance that has been noted in the copper market in the last few days will be sustained. It is utter folly to characterize the market as a producers' affair. There is too much copper in second hands for that, but the latter find it easier to sell at 18¾c. than they did at 18c. Whenever the copper market is sick, consumers turn their backs on it. Now that prices are going up, they are showing interest.

Lead—The leading producing interest is sold months ahead and independents and resellers are booking business for nearby metal at 8.25c. to 8.50c., New York, $5 to $10 a ton over the official A. S. & R. Co.'s price.

Zinc—The market shows a slightly better undertone and gradual recovery to 8c. East St. Louis would surprise no one.

Automotive Financial Notes

Triangle Truck Co., St. Louis, will increase its capital stock from $200,000 to $400,000 through action taken by the stockholders, the distribution of a 10 per cent stock dividend being voted at the same time. During the last year the company earned 12½ per cent. The directorate at the annual meeting was increased from seven to fifteen.

Ajax Motors Corp., which is headed by Chester I. Campbell, secretary of the Boston Automobile Dealers' Association, has been granted a Massachusetts charter by the Commissioner of Corporations. The corporation is capitalized for $5,000,000 with 500,000 shares of common stock at a par value of $10.

Goodyear Tire & Rubber Co. sales for six months, ending April 30, were $104,251,000, an increase of 59.3 per cent over the same period in 1919. Net earnings before deduction of dividends and taxes were $9,663,179. This is equal to about 46 per cent on the $20,750,000 of common stock.

Kelly-Springfield Tire Co. has declared a stock dividend of 3 per cent on its common stock which is additional to a quarterly cash dividend of $1 a share on its common stock, payable Aug. 2. It has also declared a quarterly dividend of $2 on the preferred stock payable Aug. 16.

Albion Foundry & Machine Co. has been incorporated at Albion, Michigan, with a capital of $100,000. The concern has leased the foundry of the Union Steel Products Co. for temporary operation but later will build its own factory. Arthur C. Hudnatt is president and manager.

Stewart-Warner Speedometer Corp. for the three months ended March 31, shows net profits of $579,304, after depreciation and Federal taxes, this being equivalent to $1.45 a share earned on the 400,000 shares of outstanding common stock of no par value. Sales for six months of 1920 were $8,000,000.

General Motors Corp. in its quarterly statement ended March 31, shows net profits of $28,081,166. After Federal taxes, debenture and preferred dividends there was a balance of $18,500,133 available for the common stock.

Autosale Corp. in its report for the three months ended March 31, last, shows profits of $43,843; dividend paid on preferred stock, $39,795; surplus, $4,048; previous surplus, $273,741.

Phelps Co., Springfield, Mass., has been incorporated with a capitalization of $200,000. It will take contracts for the manufacture of motor accessories, chiefly the Phelps tire cleats for automobile trucks.

Herschell-Spillman Motor Co. has declared a quarterly dividend of 2 per cent and an extra dividend of half of 1 per cent on the common stock and a quarterly dividend of 2 per cent on preferred all payable July 1.

Peerless Truck and Motor Corp. reports sales aggregating $12,928,601 for the year ending Dec. 31, with net earnings of $872,154 after charges and dividend taxes. Of this amount $670,628 was available for surplus after allowing for dividends.

Erie Tire & Rubber Co. stockholders voted to increase the authorized capital of the company to $10,000,000 for the purpose of erecting large additions to the plant and doubling the output.

Fisher Body Ohio Corp. has re-elected directors and announces a dividend on preferred stock will be paid not later than Jan. 31. The statement was made by President F. J. Fisher.

Consolidated Truck & Tractor Corp., Detroit, has increased its capital stock from $1,500,000 to $2,500,000 and changed its name to Consolidated Automotive Industries, Inc.

Lee Rubber Co., Boston, approximated $550,000 gross sales in June. For the six months ended June 30 sales were 60 per cent more than the first half of last year.

Curtiss Aeroplane & Motor Corp. has deferred action on the preferred stock dividend, due July 15, so that the working capital may be conserved at this time.

United States Rubber Co. has declared regular quarterly dividends of $2 a share on common stock and on the first preferred both payable July 31.

Massachusetts Signalite Sales Corp., Boston, dealers in mechanical signals for automobiles, has incorporated with a capitalization of $100,000.

Kelley Tire & Rubber Co., New Haven, has increased its capitalization from $1,000,000 to $5,000,000 for the purpose of expansion.

Auto Dash Co. directors have declared the first quarterly dividend of 2 per cent on the new preferred stock payable July 20.

Kelsey Wheel Co. has declared the regular quarterly dividend of 1¾ per cent on the preferred stock, payable Aug. 1.

Packard Motor Car Co. directors have declared a quarterly dividend of 2½ per cent on common payable July 31.

Dearborn Truck Co. paid a regular quarterly dividend of 1¾ per cent on preferred stock on July 1.

Moline Plow Co. has declared a quarterly dividend of $1.75 a share on the first preferred stock payable Sept. 1.

Standard Motor Construction Co. has declared a quarterly dividend of 2½ per cent payable Aug. 2.

Sales Expansion Co., Waltham, Mass., has filed papers of incorporation with $100,000 capital stock.

Bower Roller Bearings Co. paid a quarterly dividend of 5 per cent on July 1.

WILLYS CUT DEBT $15,000,000

NEW YORK, July 12—Willys-Overland has been supplied with approximately $20,000,000 cash by the new financial interests which have been added to the directorate. Its indebtedness has been reduced by $15,000,000 and there are indications it will be cut still more. The new capital already has been reflected in increased net income of approximately $6,000,000 after Federal taxes for the first six months of 1920. Sales for the first four months of the year were approximately $47,000,000, or nearly as much as for all of 1919.

GERLINGER COMPANIES MERGE

WEST ALLIS, WIS., July 12—The Gerlinger Steel Casting Co. and the Gerlinger Electric Steel Foundry Co. have been consolidated under the name of Gerlinger Electric Steel Casting Co., a Wisconsin corporation with $500,000 capital stock. First mortgage serial gold bonds, to the sum of $300,000, are being issued, of which $30,000 will mature annually 1926 to 1935, inclusive. This will fund the floating indebtedness incurred through the erection of a new foundry plant and the purchase of the adjoining Radcliffe Manufacturing Co. property of two and one-half acres.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, July 15—The easing of local call money rates early last week seemed to confirm the expectation that an easier credit situation would follow the June 30-July 1 transactions. The prevailing call rate was as low as 7 per cent, with practically no calling of loans, although there was an upward spurt to 10 per cent Friday afternoon. On Saturday, however, the rate was again steady at 7 per cent, while throughout the day on the following Monday the rate was 8 per cent. The announcement on Friday of two new offerings of Treasury Certificates of Indebtedness totaling about $200,000,000, of 6 and 8 months' maturities, and bearing interest at 5¾ per cent, was also interpreted in some quarters as indicating the approach of lower interest rates in general. The last previous offering of Certificates bore 5¾ per cent and 6 per cent for maturities of 6 months and 1 year respectively. The new issue of 8 months' bills at 5¾ per cent, as compared with the previous 1-year notes at 6 per cent, however, is not a clear evidence of definitely lower money rates to be expected in the immediate future. Time money rates remain unchanged at 8 to 9 per cent.

The prompt absorption of two issues of new securities aggregating $85,000,000—the Government of Switzerland 20-Year Bonds and the Armour & Company 10-Year Notes—and the advance of certain recent bonds above the issue prices have given a more optimistic tone to opinion respecting the capacity of the investment market. The 8 per cent Swiss bonds, issued at par, were quoted in New York July 13 at 102⅜ bid, 102¾ asked. The Belgian 25-Year 7½ per per cent bonds, which were issued here in June at 97¼, were quoted the same day at 100 bid, 100¼ asked.

An additional shipment of a little more than $3,000,000 gold has been received in this port, but not in time to affect the last statement of the Federal Reserve banks. The total gold reserves of the system were $380,000 lower on Friday than a week earlier and total cash reserves had declined $1,308,000. Bills discounted were reduced $1,095,000. All classes of deposits were lower, the decline in net deposits for the week being $47,022,000. On the other hand, there was an increase of $12,134,000 in Federal Reserve note circulation. In consequence, the ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against net deposits, was raised from 47.2 per cent to 47.5 per cent.

Men of the Industry

G. J. Brittain has been appointed vice-president and general manager of the Canadian Fairbanks-Morse Co., Ltd., with headquarters in Montreal. He was formerly manager of the Winnipeg branch and succeeds C. G. Drinkwater who has been vice-president in charge of sales for many years and who has resigned to enter the banking business. Brittain is succeeded in Winnipeg by Kenneth Forbes, who is in turn succeeded in St. John, N. B. by W. J. Hill. Other appointments are of Malcolm Cordell as Montreal manager; George L. Nies, Calgary manager, and Archibald Turner, Saskatoon manager.

E. R. Bacon, who recently sold his interests in the Horizontal Hydraulic Hoist Co., Milwaukee, to Gar Wood and associates, of the Wood Hydraulic Hoist Co., Detroit, has gone to San Francisco to take personal charge of the Edward R. Bacon Co., distributer of the hoists on the Pacific Coast and in the Orient. The Milwaukee plant makes horizontal hoists exclusively, while the Detroit plant builds vertical types. Logan Wood, vice-president of the Wood company, has moved his residence from Chicago to Milwaukee to be general superintendent of the local works.

W. W. Mountain, vice-president and general manager of the Curtiss Aeroplane & Motor Corp., has resigned to devote his attention to the Mountain Paint & Varnish Works Toledo, of which he is president. A. V. Crary has been appointed general sales manager of the Curtiss company, and H. P. Meredith, formerly with Du Pont and General Motors, manager of manufacture. R. W. Moore has been made general business manager, and F. H. Russell and Maurice Connolly, special representatives.

W. T. Bush, Packard central district manager, has been made general manager of the Packard Detroit branch to succeed Oscar Coolican. H. W. Drew, assistant to the general sales manager at the Packard plant has been made eastern district manager succeeding B. C. Helm who resigned. A. F. Gable, Jr., who recently joined the Packard organization from Swift & Co., has been made Packard central district manager succeeding Bush.

Col. H. W. Alden, past-president of the Society of Automotive Engineers, has been designated as representative of the society on the Federal Highway Council transportation committee, and also to serve on the committee of sub-grade in its relation to road surfacing. Colonel Alden is vice-president of the Timken-Detroit Axle Company.

L. K. Weber, widely known in the industry in Detroit, has severed his connection with the Hudson Motor Car Company's advertising department and will locate in Chicago. Weber is succeeded by B. P. Garnett who at one time was connected with the Packard advertising department.

Walter H. Shimpf, until recently eastern district representative of the Paige, truck department, has become sales manager of A. H. Lyons & Co., storage battery manufacturer, of Philadelphia. Shimpf has deferred action on his plan to manufacture in Newark, N. J., a car to be called the Larchmont.

G. L. Crosby has been appointed general sales manager of the Roller-Smith Co., at New York. M. Frankel has been made western sales manager at Chicago; W. J. Shire, eastern sales manager at New York; C. G. Kahant, export manager and district sales manager at New York.

C. M. Mohler, formerly assistant to the general manager and in charge of manufacturing and engineering for the Armleder company, at Cincinnati, has been made service superintendent for the Simons Sales Co., in Detroit, distributer of Willys-Overland cars in Michigan.

Harry A. Biggs has been appointed vice-president of the Studebaker corporation. L. J. Ollier, formerly vice-president, who has just returned from abroad, will have charge of export sales. E. H. McCarty and H. S. Welch will be assistants to the vice-president.

W. C. Schrage has been made president and treasurer of the Pittsburgh Shafting Co., of Detroit, and Thomas H. Booth has been promoted to vice-president and general sales manager. Schrage joined the company fifteen years ago as a bookkeeper.

W. C. Anderson, head of the Ford interests in England, will sail from New York for that country on July 17. Anderson has been in the United States for several weeks and attended the recent foreign convention of Ford managers at Detroit.

Burt R. Barr, for the past two years advertising and assistant sales manager of the Stewart Motor Corp., Buffalo, has been appointed sales and advertising manager with the Houdaille Co., also of Buffalo.

Miss Ethel M. Veirs, who for sometime has been connected with the advertising department of the Studebaker corporation has joined the organization of Cliff Noble at the Liberty factory.

H. L. Beckwith, who resigned as service manager of the General Motor Truck Co., July 1, has been made general manager of the King Trailer Co., at Ann Arbor, Mich.

Claude Hall has left the J. C. Wilson Co., to become general superintendent of Reynolds Motor Truck Co., at Mount Clemens, Mich.

Louis Rose has been made Chicago branch manager for the Starweather company, distributer of gas indicators.

W. E. Hutchison has been appointed purchasing agent for the Southern Motor Mfg. Assn., Ltd., Houston, Texas.

G. F. Lewis and H. B. Tibbitts have been added to the board of directors of the Stromberg Carburetor Co.

George D. Luther has been appointed soliciting agent in Seattle for the Electric Storage Battery Co.

FORD, LTD., PAYS DIVIDEND

DETROIT, July 14—Ford Motor Co., Ltd., of Canada, has declared a dividend of $15 on the common stock, payable July 15 to stock of record July 12. This is the first dividend declared this year by the Canadian branch and compares with 35 per cent in dividends for the entire year of 1919.

RYAN OUT OF STROMBERG

NEW YORK, July 14—Allan A. Ryan has resigned as a director and chairman of the board of the Stromberg Carbureter Co. of America. His successor as chairman has not been announced.

Michigan University Honors H. M. Leland

DETROIT, July 12—The honorary degree of doctor of engineering has been conferred by the University of Michigan upon Henry M. Leland, president of the Lincoln Motor Co., one of the pioneers in the industry. He was one of the organizers of the Cadillac Automobile Co. in 1902 and remained with it until 1917. He and Wilfrid C. Leland left the Cadillac at that time to undertake the production of Liberty motors. The Lincoln Motor Co. was the result.

After the armistice was signed the Lelands began the development of a motor car in accordance with some of their newer ideals and after more than a year's refinements it soon will make its appearance.

In conferring the degree upon Leland, President Hutchins of the university said:

"Always standing for the very highest ideals, he has made a record in the field of mechanical science as applied to manufacturing development that has brought to him not only local and national but also foreign recognition."

MOTT SEEKS GOVERNORSHIP

FLINT, MICH., July 12—C. S. Mott, a director of General Motors Corp., and three times mayor of Flint, has announced his candidacy for the nomination for governor on the Republican ticket at the August primaries. In his announcement Mott states that he is an "engineer by profession and an administrator by experience," and declares if the people want the state run on businesslike and economic lines he is the man, and adds, "I believe I am schooled for the task." There are seven other candidates in the race.

HARRY W. DUPUY DIES

NEW YORK, July 10—Harry Wilfred DuPuy, elder son of Mr. and Mrs. Herbert DuPuy, died suddenly this week at a hospital in this city. After completing a course at Yale in 1903, DuPuy devoted himself to the service of the Pennsylvania Rubber Co., and it was largely through his efforts that the company was reorganized in 1910. He was deeply interested in the welfare of the company's employees and was responsible for an important home-owning development. DuPuy was a volunteer in the World War and won a commission at Plattsburg. His army service was largely responsible for undermining his health. He was not 40 years old.

WILTON ADDS NEW PLANT

DETROIT, July 10—Wilton Tool & Mfg. Co. has added a heat-treating plant as another step in the expansion program which was inaugurated by the addition of the Wilton Engineering Co., 18 months ago. The heat treating department will be equipped with modern appliances and methods for practical and uniform production in keeping with the increased demand.

Calendar

SHOWS

Aug. 23-27—San Francisco, National Traffic Officers' Safety First Exposition, Auditorium, C. De Witt De Mar, Manager.

Aug. 28-Sept. 11—Toronto, Canada, National Automobile Show, Automotive Industries of Canada, in connection with Canadian National Exhibition, Exhibition City.

Sept. 20-26—Los Angeles, National Tractor and Implement Show of the West, Tractor and Implement Dealers' Ass'n of Southern California, Guy H. Hall, Mgr.

Oct. 6-16—New York, Electrical Show, Grand Central Palace, George F. Parker, Manager.

Nov. 14-21—NewYork, Automobile Salon, Commodore Hotel Ballroom.

Nov. 15-20—Chicago, Automotive Equipment Show, Coliseum, Automotive Equipment Association.

Dec. 10-18—New York, Motor Boat Show, Grand Central Palace.

Jan. 8-15—New York, National Passenger Car Show, Grand Central Palace. Auspices of N.A.C.C.

Jan. 29-Feb. 4 — Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.

Feb. 6-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.

FOREIGN SHOWS

Aug. 7-Sept. 15 — Motorcycles, sidecars, etc. Antwerp.

October—London. Commercial Vehicle Show, Olympia.

November—London. Passenger Car Show, Olympia.

CONTESTS

July 24—Watertown, N. Y. Dirt track.

July 31—Fulton, N. Y. Dirt track.

Aug. 7—Erie, Pa. Dirt track.

Aug. 14—Buffalo, N. Y. Dirt track.

Aug. 20-21—Middletown, N. Y. Dirt track.

Aug. 21—Johnstown City, Pa. Dirt track.

Aug. 21—Elgin, Ill. Road race, Chicago Automobile Club.

Aug. 28—Canandaigua, N. Y. Dirt track.

Aug. 27-8—Flemington, N. J. Dirt track.

Sept. 5 — Targa Florio Race, Sicily.

Sept. 6—Hornell, N. Y. Dirt track.

Sept. 6—Cincinnati, O. Speedway.

Sept. 6—Uniontown, Pa. Speedway.

Sept. 17-18—Syracuse, N. Y. Dirt track.

Sept. 25—Allentown, Pa. Dirt track.

Oct. 1-2—Trenton, N. J. Dirt track.

Oct. 8-9—Danbury, Conn. Dirt track.

CONVENTIONS

Aug. 10—Niagara Falls, Ont. Automotive Metal Wheel Ass'n, Clifton House. Standardization Discussions.

Sept. 16-17—Cleveland, Motor and Accessory Manufacturers' Ass'n. Credit Convention.

South Africa Proposes International Exhibit

LONDON, June 18—(*Special Correspondence*)—The British South African Export Gazette (a monthly) suggests that the time and circumstances (notably the competition from America) call for the inauguration of a yearly automobile show in South Africa, and calls on the South African Society of Motor Traders to get busy about it. The show, it suggests, should be international, a point on which the "Gazette" observes that "American firms would certainly seize the opportunity afforded." The show would include cars, trucks, land tractors and motorcycles. The proposed show would be held close on the London Olympia Show, with a sufficient interval to enable the show chassis to reach South Africa after the London show.

Figures quoted by the "Gazette" show the relative imports of automobiles into South Africa. The figures are given for the years 1918 and 1919. The import value of British cars and trucks in 1919 was $535,300 and of motor and other cycles $326,785, as compared with the corresponding categories for the United States which were, respectively, $5,905,365 and $596,135. The motor imports from European countries had a higher aggregate value than British exports, the figures for cars and trucks being $1,416,600 but only $75 for motorcycles and bicycles.

AERIAL DERBY TESTS PLANNED

BOSTON, July 10—A test flight around the world will be made in preparation for the First Aerial Derby Around the World, to take place in 1921, according to plans of the commissioners organizing the derby. Tentative plans for such a flight were recently made by the Handley Page airplane firm in England and Maj. Charles J. Glidden, a Boston man and founder of the Glidden tours, who was executive secretary of the organizing commission.

The airplane to be used in the world tour will be of the same general type as those now used on the London-Paris air line, but will be of improved design, capable of permitting transfer of the landing gear from that required on land to that necessary for alighting upon water, it is said. It will have sufficient motor and carrying capacity to cross both the Atlantic and Pacific Oceans via the route already laid down by the commission and formerly outlined.

Canada Sets Dates for National Show

TORONTO, July 12—Canada's only National Automobile Show under the sanction and support of the Automotive Industries of Canada (the National Automobile Chambers of Commerce of the Dominion) will be held in conjunction with the Canadian National Exhibition, Exhibition City, Toronto, Aug. 28 to Sept. 11 inclusive. The Canadian National Exhibition is the largest in the world. The attendance last year was a million and a quarter. It is estimated that nearly a million attended the motor show.

The Transportation building has been redecorated and will be given over exclusively to passenger car exhibits. The two demobilization buildings to the west will house the trucks and accessory exhibits. Overflow automotive equipment and motorboats will be shown in the Grand Stand building. As the new $2,000,000 arena has not been completed, the airplane and tractor displays will be under canvas in circus tents and hangars. Although all space had been applied for some time ago, the exhibition authorities have not made allotments as it is their intention to make the show as comprehensive and all inclusive as possible. The early birds in the trade and industry do not approve of this as it necessarily means cramping of individual exhibits. By another year it is hoped that the much forecasted Automotive Palace will have been erected.

Michigan Pikes Tour Starts 15 Day Journey

DETROIT, July 14—Good roads enthusiasts, automobile manufacturers and dealers joined in the Michigan Pikes International Good Roads Tour which left here to-night for a 15 days' trip into Canada. More than 350 persons made up the touring party, which is held under the co-operation of the Detroit Automobile Club, the Michigan Good Roads Association, the Ontario Motor League, Michigan State Council of Motor Clubs, Detroit Automobile Dealers' Association, Michigan and Ontario Chambers of Commerce and the A. A. A.

While the interests of good roads is the primary factor, the opportunity the tour affords for cementing closer relations with Canada will be used to full advantage. Speakers of national and international prominence accompany the tour and will deliver addresses.

The tourists will make noon and night stops in the principal cities including Toronto through North Bay, Espanola and to the Canadian Soo. Crossing to Michigan the party will touch Sheboygan and the cities along Lake Huron, spending the last night of the tour at Jackson, after a noon trip to Lansing, returning to Detroit to receive a homecoming welcome at an elaborate function which is being arranged by the Detroit Automobile Dealers' Association and which will include a parade of hundreds of automobiles and trucks, to be driven out to meet the tourists and escort them into the city.

STAGE EXHIBIT AT PRAGUE

NEW YORK, July 12—The first postwar automobile exhibition in the new Czecho-Slovak republic, according to information received in New York, will be held by the Czecho-Slovak Automobile Club at Prague, July 17 to 25. The showing will be made in the Palais de l'Industrie and will embrace cars, trucks, tractors, automotive equipment and accessories, as well as agricultural and motor machinery.